JOURNAL OF THE IRON AND STEEL INSTITUTE

VOLUME 166 1950

SUBJECT INDEX

[References to papers and articles given in full text are indicated by the word (*Paper*) following the page number.

Indexing of Alloy Steels and Other Alloys : In the indexing of alloy steels, carbon and iron are ignored and the alloying elements contained in the steel are arranged in alphabetical order; for example, all references to nickel–chromium–molybdenum steel will be found under the heading chromium–molybdenum–nickel steel. In the indexing of other alloys, carbon and iron when present, are included in the title; iron when present is always mentioned first and the other elements follow in alphabetical order, carbon being in all cases mentioned last. Examples: "Iron–silicon–carbon alloys" and "iron–chromium–nickel–carbon alloys."]

Abrasion, interferometric test, 385
Abrasives, effect on metal wear, 269; enveloping with electrodeposit, 160
Aircraft Steels, fatigue limits, 161
Allegheny Ludlum Steel Corp., soaking pits, 372
Allen (W. H.), Sons and Co., Ltd., horizontal press, 158
Alloy Cast Iron, structural diagrams, 163
Alloy Steel, corrosion-resistant, 163; determination of vanadium in, 164; Jominy test, 264; metallography, 384
Alloy Structure, in relation to electronic theory, 385
Alloys, copper–gold, superlattice structure, 386; copper–magnesium additions to cast iron, 261; iron–aluminium, superlattice structure, 386; iron–aluminium–nickel, 200; iron–chromium–molybdenum sigma phase, 383; iron–chromium–nickel, 200; iron–manganese free-energy and metastable states, 200; iron–nickel equilibrium diagram, 200; iron–nickel free-energy and metastable states, 200; iron–nickel magnetic properties, 381; iron–nickel oxidation at high temperatures, 164; iron–nickel transformations, 281 (*Paper*); iron–silicon magnetic properties, 381
Alnico Alloys, casting and heat-treatment for permanent magnets, 263
Altos Hornos de Vizcaya, S.A., iron-ore preparation, 362
Aluminium, coating on steel, 267; in deoxidation of iron, 367; effect on steel fluidity, 262; Gmelins Handbuch, 167 (*Book*); grain-growth control by, 368; in patternmaking, 369; spraying, 98; use in hot-dip galvanizing, 77 (*Paper*)
Aluminium Alloys, Gmelins Handbuch, 167 (*Book*)
Aluminium Nitride, determination in steel, 164, 271
Ammonium Sulphate, recovery from coke-oven gas, 155
Analysis, 164, 271, 389; colorimetric apparatus, 271; colorimetric determination of molybdenum, 389; nephelometric, 165; polarographic, 165; spectrochemical, of slags, 273 (*Paper*); spectrographic, 165; spectrographic determination of carbon, 389; spectrographic determination of magnesium in nodular iron, 389; spectrographic determination of phosphorus in steel,
Analysis—*continued*
118 (*Paper*); spectrographic in Italy, 164; spectrographic source-unit behaviour, 329 (*Paper*); spectrographic source-unit contribution to variability, 325 (*Paper*); spectrographic, of steel, 164; spectrographic, of steel and spelter, 164; spectrographic, of tungsten steels, 165; spectroscopic, of steel, 164; spectrum direct-reading apparatus, 164
Analysis of, gas from cast iron, 271; spelter by spectrography, 164; steel by spectrography, 164
Analysis Standardization, in Brazil, 390
Anisotropy, annealed metals, 99; in cold-reduced sheet, 161
Annealed Metals, anisotropy, 99
Annealing, for machinability, 157; salt baths, 95
Annealing Furnaces, for automobile axles, 372; charging machine, 95; coil, 263; for malleable iron, 369
Antimony, 272 (*Book*)
Appleby-Frodingham Steel Co., carbon blast-furnace refractories, 122, 365
Arc Furnaces. *See* Electric Furnaces
Arc Welding. *See* Welding
Arsenic, determination in iron and steel, 164
Ateliers de Constructions Electriques de Charleroi, induction-melting vacuum furnaces, 262
Atomic Energy, encyclopedia, 166 (*Book*)
Argentina, foundry industry, 371; foundry mechanization, 371; metallurgical industry, 390; steel production, 366
Austenite, formation in steel, 386; retardation by nickel, 384; transformation, 163; transformation kinetics, 157
Australia, coal-deposits geology, 361
Automobile Bodies, cleaning and finishing at Cowley, 98
Automobile Industry, centrifugal casting, 370; chromium-plating applications, 160
Automobile Parts, axle-annealing furnace, 372; engine wear, 379; fender welding, 159

Banox Cold-Drawing Lubricant, 158
Basalt Rock Co., seam-welded pipe production, 96
Beardmore (William) and Co., Ltd., production of steel plates, 32
Bearings, greases, 158; oil-film thickness determination, 373; Permali, 158; self-oiling, production by powder metallurgy, 99
Bend Tests, ductile–brittle transition, 377
Bending, elastic limit of spring strip, 99; plastic, 100
Bentonite, effect of moisture on strength, 262; Hungarian deposits, 93; structure, 263
Bessemer Converter. *See* Converters
Bessemer Process, temperature and flame measurement, 259
Bessemer Steel, acid, killed, 259
Bethlehem Steel Co., personnel training, 166
Billets, temperature measurement, 94; walking-beam heat-treatment furnace, 372
Biographies, *frontispiece*, also to face 104, 272; contributors to *Journal*, 90, 150, 357
Blast-Furnace, 155, 258, 365; carbon refractories at Appleby-Frodingham, 122, 365; comparison with electric reduction furnaces, 365; compensated charging, 315; desulphurization in, 300; distribution in compensated charging, 315; distribution, factors affecting, 339 (*Paper*); experimental, 315; gas-transit-time determination by radio-active technique, 315; hand-charged, last in America, 258; high-top-pressure operation, 259, 365; large and small, operational comparisons, 258, 259; skip-hoist drive, 258; stockline-contour measurement, 84 (*Paper*); technical and economic aspects, 155
Blast-Furnace Coke, crushing resistance, 258
Blast-Furnace Flue Dust, nodulizing with fine ore, 154
Blast-Furnace Plant, electrical load, 258
Blast-Furnace Practice, 155, 258, 365; cold carbonated blast, 365; extra-coke burdening, 258; quicklime addition in charge, 258
Blast-Furnace Slag, air-conditioning removal-crane cab, 265; granulated, for cement production, 259; phosphorus enrichment by phosphate additions, 259
Blast-Furnace Stoves, 365; checkerwork, 258; in France, 258; use and efficiency, 258

Boeing Aircraft Co., cutting stainless steel, 95
Boiler Feed Water, oxygen-free, 387
Boiler Steels, research in Russia, 162
Boilers, corrosion mechanisms, 387
Book Notices, 101, 166, 271, 391
Boron, effect on mechanical properties, 193
Boron Trifluoride, as brazing flux, 159
Brass, electrolytic polishing, 96
Brazil, analysis standardization, 390 ; arc welding, 374 ; cast-iron production in induction furnaces, 368 ; coking coal, 364 ; converter/open-hearth duplexing, 366 ; direct-reduction economics, 366 ; foundry mechanization, 371 ; iron-ore reducibilities, 366 ; iron-ore resources, 93 ; ironmaking history, 390 ; Minas Geraes metallurgical industry, 391 ; ore deposits, 361 ; pig-iron classifications, 269, 384 ; pig-iron production, 155 ; sintering plant, 363 ; sintering trials, 363 ; special-steel production, 367 ; sponge-iron production, 366
Brazing, fluxes, 159 ; metal preparation, 159 ; pressed parts, 374 ; silver, of stainless steel, 266
British Iron and Steel Research Association, high-temperature microscope, 385
Brittle Fracture, mild steel, 268
Burroughs Adding Machine Co., induction heating, 263

Cadmium Plating, corrosion, 270
Canada, ferrous melting furnaces, 156
Canadian Sumner Iron Works, Ltd., production of Sorbo-Mat iron, 368
Carbon, combined, determination in malleable iron, 165 ; determination by induction-combustion method, 271 ; determination in low-carbon steels, 113 (*Paper*) ; determination in steel by spectrography, 389 ; diffusion and solubility in alpha iron, 163 ; effect on steel fluidity, 262 ; effect on weldability, 96
Carburization, furnaces, 95 ; gas, 157 ; steel by charcoal, 157 ; study of processes, 94
Carnegie-Illinois Steel Corp., MX steel, 94 ; stamping theories, 95
Carpenter Steel Co., modified immersion Rayotube, 257
Case Hardening, carbonitriding process, 263
Cast Iron, acicular, 368 ; alloy, structural diagrams, 163 ; analysis by spectrography, 165 ; crystallization, 368 ; copper–magnesium additions, 261 ; desulphurization, 261 ; determination of copper by photometry, 164 ; ductile, 368 ; freezing hypo-eutectic, silicon distribution, 303 ; gas analysis by hot-extrusion method, 271 ; for glass moulds, 384 ; graphite conversion, 261 ; graphite formation, 261 ; grey. *See* Grey Cast Iron ; inoculation, 369 ; magnesium additions, 261 ; malleablization, 369 ; micrographic-texture classification, 385 ; nodular. *See* Nodular Cast Iron ; oxy-acetylene welding, 392 (*Book*) ; production in induction furnaces, 368 ; for resistance elements, 384 ; Sorbo-Mat, 368 ; stress analysis by resistance strain gauges, 377, 378 ; welding, 96 ; white. *See* White Cast Iron
Cast-Iron Beams, stress/strain tests, 378
Cast-Iron Crankshafts, possibilities in Diesel engines, 370 ; strain testing, 377
Cast-Iron Engine Parts, testing, 377, 378
Cast-Iron Parts, stress testing, 378
Cast-Iron Pipes, buried, corrosion, 388
Cast Steel, tensile-test reproducibility, 376
Casting, Alnico alloys, 263 ; centrifugal. *See* Centrifugal Casting ; engine bases, 157 ; feeder nomenclature, 369 ; grey iron for piston rings, 370 ; investment. *See* Investment Casting ; permanent magnets, 370 ; precision, lost-wax
Casting—*continued*
process, 370 ; pulleys, 157 ; rolling-mill housings, 370 ; steel-press cylinders, 369
Castings, economics compared with forgings, etc., 368 ; grey-iron. *See* Grey-Iron Castings ; heavy, production, 260 ; historical, in Czechoslovakia, 390 ; Hydro-Blast cleaning, 371 ; production and design, 391 (*Book*) ; production organization and control, 157 ; radiography, 382 ; rat-tail defects, 371 ; steel. *See* Steel Castings ; surface-roughness meter, 371
Catalan Forge, conversion to blast-furnace, 165 ; iron properties, 384
Cathode-Ray Oscillograph, in study of heating and cooling, 386
Cathodic Protection, gas-distribution systems, 389 ; rectifiers and galvanic anodes, 389
Cement, blast-furnace slag for, 259
Centrifugal Casting, in automobile industry, 370 ; piston rings, 370 ; turbine rotor parts, 370
Charcoal, in decarburization, 157
Chemical Industry, corrosion-resistant alloy steels, 163
Chromite, Montana deposits, 93 ; Turkish deposits, 361
Chromium, determination in steel by spectrography, 164 ; diffusion in hot-chromizing, 97 ; effect on steel fluidity, 262 ; recovery in acid arc furnace, 367 ; reduction and recovery in open-hearth, 156
Chromium Alloys, vacuum melting, 384
Chromium–Molybdenum Steel, dilatometric curve, 377 ; electron-microscope study, 163 ; heat flow in rocket-motor walls, 269 ; influence of microstructure on hot strength, 383
Chromium–Molybdenum–Nickel Steel, effect of heat-treatment on sigma phase, 162 ; hair-line cracks, 269 ; stress-corrosion tests, 389
Chromium – Molybdenum – Silicon Steel, superheater-tube cracks, 269
Chromium–Nickel Steel, austenitic, sigma phase, 383 ; determination of phosphorus in, 389 ; in heavy chemical industry, 163
Chromium Plating, automobile-industry applications, 160 ; batch production, 160 ; corrosion resistance, 388 ; drop-forging dies, 158 ; gauges, 160 ; hard, developments, 160 ; hard, electrolytic polishing, 160 ; magnetic measurement of thickness, 160 ; plant and processes, 160 ; radio-active-tracer study, 97 ; wear resistance, 267
Chromium-Plating Solutions, determination of sulphuric acid in, 164 ; self-regulating, 97
Chromium Steel, sigma-phase formation, 383
Chromium–Vanadium Steel, determination of phosphorus in, 389
Chrysler Corp., production of stainless powder parts, 376
Clad Steel, stainless, welding, 266
Cleaning, 96, 160, 267, 375
Coal, ash, effect on high-temperature corrosion, 387 ; Australian, geology, 361 ; cleaning tests, 257 ; coking, in Brazil, 364 ; coking, expansion pressure, 154 ; coking tests, 364 ; preparation in Holland, 364 ; sampling for analysis, 390 ; testing for cokemaking, 364 ; washery thickeners, 364
Coatings, aluminium on steel, 267 ; cadmium, corrosion, 270 ; electrodeposited, for corrosion protection, 97 ; electrodeposited, corrosion tests, 270 ; electrodeposited, properties, 97 ; electrodeposited tin–zinc, 98 ; metal, application by vacuum evaporation, 267 ; organic, salt-spray tests, 389 ; protective, 97, 160, 267, 375, 389, 391 (*Book*) ; sprayed, for corrosion protection, 98 ; zinc, continuous units,
Coatings—*continued*
375 ; zinc, corrosion, 270 ; zinc, Wean Titecote process, 375
Cobalt, determination in nickel-plating solutions, 268
Coke, crushing resistance in blast-furnace, 258 ; reactivity in cupola, 368
Coke-Oven Gas, increasing production, 364
Coke-Oven Plant, ammonium sulphate recovery, 155
Coke Ovens, coal-expansion pressure, 154 ; increasing gas production, 364 ; repair and rebuilding, 155 ; temperature control, 257
Coking Tests, 364
Cold Drawing, lubricants, 158
Cold Heading, set screws, 95
Cold Rolling, 264 ; compression test, 305
Colorado Fuel and Iron Corp., iron-ore preparation, 154 ; new rod mill, 158
Colorimetric Analysis, apparatus, 271 ; determination of molybdenum in steel, 389
Colvilles, Ltd , production of steel plates, 32
Companhia Aços Especiais Itabira, special-steel production, 367
Companhia Siderurgica Belgo Mineira, S.A., sintering plant, 363
Compressed Air, compressor maintenance, 260 ; for forging, 373 ; gun for cupola patching, 260 ; preheating for forging, 372
Comptoir Industriel d'Etirage et de Profilage des Métaux, tube-extrusion press, 373
Converters, basic, oxygen-enriched air, 156, 259 ; duplexing with open-hearth in Brazil, 366 ; side-blown, aerodynamic aspects, 262 ; side-blown, design, 262 ; side-blown, design and practice, 261 ; side-blown, duplexing with cupola, 262 ; side-blown, gas and fluid flow in model, 186 ; temperature measurement, 257, 258
Cooling, cathode-ray oscillograph study, 386
Copper, determination in cast iron and steel by photometry, 164 ; effect on sheet-steel properties, 383 ; welding to other metals, 266
Copper–Gold Alloys, superlattice structure, 386
Copper–Magnesium Alloy, addition to cast iron, 261
Copper–Manganese Powders, pressing and sintering, 98
Copper-Plating Baths, determination of chloride in, 268 ; determination of lead in, 268
Core Blowing, machine, 370
Core Heating, infra-red stove, 370 ; ovens and practice, 370
Cores, mixture testing, 369
Corrigenda, abstracts, 391 ; book review, 391 ; compression test in relation to cold rolling, 305 ; deoxidation of iron by aluminium, 256 ; effect of cold work on steel, 256 ; penetration of molten metal into compacted sand, 256 ; pressure and flow distribution in model venturi-type open-hearth, 92 ; production of steel plates in Scotland, 360 ; use of oxygen lance in British electric-furnace practice, 256
Corrosion, 163, 270, 386 ; accelerated tests, 388 ; anodic, 386 ; bare iron or steel in sea water, 123 (*Paper*) ; of boilers, 387 ; of buried iron pipes, 388 ; of buried metals and alloys, 389 cadmium coatings, 270 ; chemical and electrochemical, 386 ; effect of adsorption phenomena, 386 ; effect of coal ash at high temperatures, 387 ; effect of rust, 388 ; electrochemical, 386 ; electrodeposited coatings, 270 ; fretting, in fitted joint, 164 ; gas cylinders, 164 ; of iron alloys by surface discontinuity, 388 ; local-cell theory, 386 ; losses in United States, 387 ; of mine-hoist ropes, 387 ; prevention in electrolytes by noble-metal layer,

Corrosion—*continued*
97 ; prevention by means other than coatings, 164 ; protection by aluminium coating, 267 ; protection by metal spraying, 98 ; protection of ships' bottoms, 387 ; protection of underwater structures, 387 ; protective electrodeposited coatings, 97 ; review, 270 ; in soil, 389 ; of steel by H_2S/air mixtures, 387 ; stress, tests on supercharger materials, 389 ; of water mains, 387 ; wire, 270 ; in wire and wire products, 270 ; zinc coatings, 270
Corrosion Cracking, 270
Corrosion Fatigue, rail webs, 379
Corrosion Resistance, alloy steel, 163 ; copper-bearing steel, 389 ; hard chromium deposits, 388 ; stainless steel welds, 163
Cracks, in chromium–molybdenum–silicon superheater tubes, 269 ; corrosion. *See* Corrosion Cracking ; detection by supersonics, 381, 382 ; discontinuous, propagation, 161 ; hair-line, effect of electrolytic hydrogen, 269
Cranes, cab air conditioning, 265 ; hoist-control circuit, 265 ; overhead in steelworks, travel-motion performance, 246
Creep, Andrade equation, 383
Creep Fracture, 269
Crystallization, cast iron, 368 ; process, 386
Cupola, coke reactivity, 368 ; desulphurization with soda ash, 260 ; high-alumina-slag practice, 260 ; hot-blast, 368 ; lining materials, 155 ; metal yield, 368 ; refractories-patching gun, 260 ; refractory burn-outs prevention, 260 ; refractory-life increasing, 260 ; refractory materials, 365
Cupola/Converter Process, 262 ; oxygen enrichment, 262 ; sulphur and phosphorus control, 262
Cupping, dies, 378 ; steel blanks, 264
Cutting, oxy-electric underwater, 375
Cyanide, hazards, 157
Czechoslovakia, historical castings, 390 ; non-metallic-inclusion research, 270

Damping, deformation, 381, 382
Dana Corp., automobile-axle annealing furnace, 372
Decarburization, in arc furnace, 260
Deep Drawing, asymmetrical, 264 ; research, 158 ; test machine, 160
Deformation, damping, 382 ; shearing determination, 100 ; significance of ductility and capacity, 379
Degassing, molten metals, 157
Deoxidation, Bessemer steel, 259 ; iron by aluminium, 367 ; steel, 156 ; thermodynamics in iron and steel making processes, 137 (*Paper*)
Dephosphorization, in basic electric furnace, 367 ; pig iron by soda, 320
Descaling, salt-bath heating, 160 ; salt baths, 95 ; sodium hydride, 375
Deseaming, by oxy-acetylene blowpipe, 159
d'Espérance-Longdoz S.A., sheet-mill buildings, 159
Desulphurization, in blast-furnace, 300 ; cast iron, 261 ; cupola iron with soda ash, 260 ; iron from blast-furnace, 155 ; in open-hearth, 300
Diamond Research Laboratory, interferometric abrasion test, 385
Diamond Dies, production, 96
Diamonds, electrodeposited coatings on, 160
Dies, cupping and redrawing, strain measurement, 378 ; diamond, production, 96 ; dinking, 95 ; drop-forging, plating, 158 ; heat-treatment, 94 ; repair by hydrogen-arc welding, 159 ; stamping, 158 ; wire-drawing, standardization, 373
Diesel Engines, cast-iron crankshafts, 370 ; cylinder-block strain testing, 377 ; wear, 379
Diffusion, chromium, 97
Dolomite. *See* Refractory Materials
Dominica, mineral deposits, 361
Drawing, 95, 158, 264, 272 ; cold, lubricants, 158 ; lubricants, 96, 158
Drop Forging, 101 (*Book*) ; die plating, 158
Ductility, killed steels, 161 ; significance in deformation, 379
Dudley (Dud), 184 (*Paper*)
Duro Felguera Metallurgical Co., sintering trials, 93, 362
Duplexing, converter/open-hearth, in Brazil, 366 ; cupola/converter, 262
Dust-Extraction Equipment, 375

Economics and Statistics, 165, 390
Edward Valves, Inc., steel-valve research, 269
Elastic Limit, spring strip, 99 ; steel, 160
Electric Furnaces, acid-arc practice, 367 ; acid practice in Britain and America, 262 ; arc, acid practice, 367 ; arc, decarburization, 260 ; arc, electrical characteristics and design, 262 ; arc, electro-hydraulic control, 367 ; arc, electrode control, 367 ; arc, inductive stirring, 94 ; arc, melting processes, 262 ; arc, oxygen with high-chromium melts, 259 ; arc oxygen with stainless steel melts, 260 ; arc, silica roof bricks, 364 ; arc, temperature measurement, 257 ; basic, dephosphorization, 367 ; basic, double-slag process, 367 ; basic, Heroult laboratory practice, 367 ; chrome-magnesite roof bricks, 364 ; chromium recovery, 367 ; duplexing with open-hearth, 262 ; heat-treatment, 372 ; high-frequency processes, 262 ; high-frequency, for vacuum melting, 262 ; induction low-frequency, for cast-iron production, 368 ; iron-ore reduction in, 365 ; melting control by spectrometer, 271 ; oxygen lancing, 261 ; pig-iron, 259 ; reduction, compared with blast-furnace, 365 ; temperature/time relationship, 258
Electric Railway Improvement Co., Cadweld process, 266
Electric Steel, acid, oxygen-decarburized, 156 ; arc, decarburization, 260 ; basic, production in Germany, 367 ; production in conjunction with open-hearth, 262 ; production practice, 367 ; quality control, 367 ; SAE X-1025, 366
Electrical Equipment, for sintering plant, 362
Electrical Resistance, change in iron during strain-ageing, 322
Electrodeposited Coatings, on abrasives, 160 ; corrosion, 270 ; for corrosion protection, 97 ; jigs for, 267 ; properties, 97
Electrolytic Colouring, stainless steel, 267
Electrolytic Polishing, 267 ; brass pressings, 96 ; hard chromium plating, 160 ; metallographic specimens, 270 ; in microhardness testing, 386 ; resistance of anodic layer, 267 ; stainless steel, 96 ; steel in chrome/acetic-acid, 267 ; surface properties, 375
Electrolytic Polishing Baths, electrical resistance and optimum composition, 96 ; overvoltage, 97
Electrolytic-Tinning Plant, 375
Electron Microscope, co-operative investigation on steel, 385 ; metallurgical applications, 271 ; study of chromium–molybdenum steel, 163 ; study of quenched and tempered steel, 17
Embrittlement, in tempered high-phosphorus steel, 161 ; weld metal, effect of cooling rate and composition, 105 (*Paper*)
Engine Bases, casting, 157
Espérance-Longdoz, S.A., d'. *See* d'Espérance-Longdoz, S.A.

Fairbanks, Morse and Co., Hydro-Blast cleaning, 371
Fatigue, fracture, 268 ; limit equation, 161 ; limits for aircraft steels, 161 ; of metals, 100
Fatigue Resistance, welded joints, 159
Fatigue Strength, effect of grinding, 380 ; effect of surface pressure, 380
Fatigue Tests, committee report, 161 ; limit equation, 161 ; notch effect, 268 ; on rail webs, 379
Ferrozirconium, determination of zirconium in, 165
Films, metal, optical constants, 375
Finishing, 160 ; stainless steel, 160
Flakes, prevention in steel, 269
Flame Cutting, 96, 158, 265, 374 ; principles and application, 159 ; in repair of blooming-mill coupling, 159
Flame Hardening, applications, 264 ; in Germany, 372 ; machine, 157
Flame Propagation, 363
Flames, low-temperature, 363 ; technology, 363 ; temperature measurement, 94
Fluidity, steel, 262
Forges de la Providence, oxygen-enriched-air tests in basic converter, 259
Forging, 95, 182, 264, 372 ; compressed-air preheating, 372 ; drop, 101 (*Book*) ; drop, die plating, 158 ; stainless steels, 95 ; supervision, 372
Forging Furnaces, walking-beam, for billets, 372
Forging Hammers, compressed air, 373
Forging Plant, at John Garrington and Sons, Ltd., 264 ; maintenance, 372
Forging Presses, components and auxiliaries, 373 ; heavy, design, 373
Forgings, cleaning, 160 ; economics compared with castings, 368
Foundry, 156, 260, 368 ; air-compressor maintenance, 260 ; Argentinian industry, 371 ; costing system, 371 ; dust control, 372 ; equipment, 370 ; grey-cast-iron distribution, 156 ; Hydro-Blast cleaning unit, 371 ; hygiene, 372 ; hygiene and safety, 372 ; laboratory equipment, 372 ; lighting and cleanliness, 371 ; mass-production equipment, 371 ; mechanization, 371 ; mechanization economics in Argentina, 371 ; mechanization possibilities in Brazil, 371 ; mechanized, 371 ; mechanized, for farm-equipment production, 371 ; metal-loss reduction, 260 ; radiography, 382 ; refractory materials, 364
Foundry Plants, Jackson Industries, Ltd., 371 ; National Farm Machinery, Inc., 371 ; Ruston and Hornsby, Ltd., 371
Foundry Practice, 156, 260, 368 ; high-frequency, 262 ; melting reactions, 368 ; in Sweden, 368 ; thermal study, 261
Foundry Sand. *See* Moulding Sand
Fractography, ingot iron, 270 ; weld metal, 269
Fracture, brittle, of mild steel, 268 ; creep, 269 ; fatigue, 268 ; oil-pump spindle, 379 ; theories, 268
France, blast-furnace stoves, 258 ; iron and steel industry, 390 ; scrap situation, 165
Fretting Corrosion, in fitted joint, 164
Friction, dimensional considerations, 379
Fuel, liquid, modern applications, 272 (*Book*)
Furnace Atmospheres, controlled, 263
Furnaces, annealing, for automobile axles, 372 ; annealing, charging machine, 95 ; annealing, coil, 263 ; annealing, for malleable iron, 369 ; blast. *See* Blast Furnace ; carburization, 95 ; chemistry and thermodynamics, 363 ; controls, 364 ; electric. *See* Electric Furnaces ; ferrous melting, in America and Canada, 156 ; flow, 156 ; forging. *See* Forging Furnaces ; galvanizing, 98 ; heat-treatment. *See* Heat-Treatment Furnaces ; induction. *See* Induction Furnaces ; liquid-fuel-fired, 272 (*Book*) ; normalizing, 264 ; open-hearth. *See* Open-Hearth Furnace ; reheating. *See* Reheating Furnaces

Galvanizing, dross-eliminating furnace, 98 ; hot-dip-coil, 267 ; hot-dip, use of aluminium, 77 (*Paper*)
Garrington (John) and Sons, Ltd., new forging plant, 264
Gas, analysis by hot-extrusion method, 271 ; coke-oven. *See* Coke-Oven Gas
Gas Cylinders, corrosion, 164 ; effect of temperature, 101 ; normalizing furnaces, 264
Gas Producers, control, 364
Gas-Turbine Alloys, effect of temperature on Young's modulus, 162
Gases, combustion with oxygen-enriched air, 257 ; inert, production and uses, 391
Gating, size calculation, 369
Gauges, chromium plating, 160 ; electric-resistance-strain applications to stress analysis, 377, 378 ; plastic-strain, 377 ; reduction-of-area, low-temperature use, 377 ; strain, in stress determinations, 100 ; wire strain, in measurement of cupping-die loads, 378
Gear Teeth, induction hardening, 95 ; wear, 379
Gear Wheels, flame-hardening machine, 157
Gears, helical, production by powder metallurgy, 99 ; wear in relation to oil viscosity, 374
Geiger Counter, nature, construction, and use, 391 ; use in spectrographic determination of phosphorus, 121 ; in X-ray spectrometry, 269
General Electric Co., piercing and blanking sheet, 95 ; testing powder parts, 99
General Motors Corp., walking-beam billet furnace, 372
Geneva Steel Co., iron-ore mining and blending, 154
Germany, basic electric-steel production, 367 ; flame hardening, 372
Glass Moulds, cast irons for, 384
Gmelins Handbuch, antimony, 272 (*Book*)
Grain-Growth, control by aluminium, 368 ; resistance tests, 380
Grain-Size, austenitic, effect on steel properties, 376 ; determination etchants, 270
Graphite, conversion in cast iron, 261 ; formation in cast iron, 261 ; grey cast iron, 261
Graphitization, influence of knock-out temperature, 156 ; in steels, 384
Greases, bearing, 158
Great Britain, acid-electric practice, 262 ; iron and steel directory, 101 (*Book*) ; iron and steel industry, 391 ; steel-foundry practice, 157
Grey Cast Iron, carbon-equivalent considerations, 377 ; casting for piston rings, 370 ; cooling curves, 386 ; distribution in foundries, 156 ; graphitization, 261 ; hardness-scales correlation, 380 ; relation of tensile strength to chemical composition, 377
Grey-Iron Castings, quality control, 260
Grinding, effect on fatigue strength, 380 ; hard-metal tips, 159 ; stainless steel, 160
Gun Steel, explosive-impact testing, 161
Gun Tubes, quench-cracking, 161

Hacksaws, hardening, 264
Hadfield Steel, properties, 384
Hair-Line Cracks, effect of electrolytic hydrogen, 269
Hard Facing, 374 ; automatic, 265
Hardenability, Jominy test, 264 ; modern conceptions, 380 ; tests, 380
Hardening, austenitic stainless steel by low-temperature working, 382 ; hack-saw blades, 264 ; induction, 372 ; induction, of gear teeth, 95 ; flame, in Germany, 372 ; flame, machine, 157 ; isothermal, of steel wire, 263 ; methods, 372 ; modern conceptions, 380 ; ploughshares, 372 ; recommendations, 372 ; surface, internal stresses, 100 ; symposium, 101 (*Book*)
Hardness, effect of pseudo flakes, 384 ; micro testing, 380 ; scale correlations for grey cast iron, 380 ; testing polished specimens, 386 ; theory, 380
Hardness Tests, Meyer, 268 ; Rockwell determination, 380 ; Rockwell determination from correlation curves, 380
Hastelloy, stress-rupture tests, 382
Heat, economy in iron and steel works, 257
Heat-Resisting Alloy, effect of coal ash on corrosion, 387
Heat-Resisting Materials, silicone paints, 268
Heat-Resisting Steel, low-alloy, 162 ; testing and high-temperature properties, 382
Heat Transfer, nomograms, 363
Heat Treatment, 94, 157, 263, 372 ; Alnico alloys, 263 ; cyanide hazards, 157 ; effect on sigma phase, 162 ; processes, 372 ; salt baths, 95 ; tools and dies, 94
Heat-Treatment Furnaces, 94, 157, 263, 372 ; developments, 94 ; electric, 372 ; temperature measurement, 258 ; walking-beam, for billets, 372
Heating, cathode-ray oscillograph study, 386 ; induction, 95, 157 ; induction, in combustion analysis method ; induction, of small parts, 263 ; infrared in foundry, 370 ; salt baths, 160 ; for wire patenting, 263
Heating Furnaces, 372
High-Speed Steel, determination of phosphorus in, 389 ; pseudo flakes, 384
High-Temperature Alloys, 382, 383
Holland, coal preparation, 364 ; Koninklijke Nederlandsche steelworks, 372
Hot Working, tool steels, 382
Human Performance, measurement, 167 (*Book*)
Hungary, bentonite deposits, 93 ; nodular-iron production, 261 ; titaniferous iron-ore concentration, 362
Hydrogen, determination in steel by Brown's method, 164 ; electrolytic, effect on hair-line cracks, 269 ; in steel, 383
Hypo-Eutectoid Steel, effect of composition on transformation, 386

Impact Tests, explosive, on gun steel, 161 ; pendulum-machine adaptation, 161
Induction Furnaces, classification, 372 ; low-frequency, for cast-iron production, 368 ; metallurgical applications, 372
Induction Hardening, 372 ; gear teeth, 95
Induction Heating, 95, 157 ; in combustion analysis method, 271 ; small parts, 263
Infra-Red Rays, drying and heating foundry cores and moulds, 370
Ingot Iron, fractography, 270
Ingot Moulds, large, 370 ; temperature distribution and its relation to ingot structure, 19 (*Paper*)
Ingots, cracking mechanism, 27 ; deseaming by oxy-acetylene blowpipe, 159 ; internal-temperature calculation from surface temperature, 71 (*Paper*) ; solidification mechanism, 27 ; structure, relation of temperature distribution in moulds, 19 (*Paper*) ; surface-defects sub-committee report, 367 ; vacuum-casting, 262
Inland Steel Co., blast-furnace data, 258 ; oxy-acetylene scarfing, 266
Interferometry, abrasion test, 385 ; multiple-beam, metallurgical applications, 385
International Harvester Co., malleable-iron annealing furnaces, 369
Investment Casting, centrifugal and vacuum, 370 ; lost-wax process, 370 ; modern practice, 370. *See also* Precision Casting
Iron, allotropy, work of F. Osmond, 390 ; alpha, carbon diffusion and solubility, 163 ; bare, corrosion in sea water, 123 (*Paper*) ; cast. *See* Cast Iron ; corrosion by rust, 388 ; cupola, desulphurization, 260 ; deoxidation by aluminium, 367 ; desulphurization, 155 ; determination of arsenic in, 164 ; determination in ores by spectrophotometry, 164 ; determination in spelter by spectrography, 164 ; determination in trivalent state, 390 ; electrical-resistance change during strain-ageing, 322 ; explosive-eroded, 270 ; ingot, fractography, 270 ; liquid. *See* Liquid Iron ; malleable. *See* Malleable Iron ; occurrence with zinc, 100 ; oxidation at 200°–400° C., 270 ; pig. *See* Pig Iron ; production in Catalan forge, 384 ; production with high-alumina slag, 260 ; production by Madaras process, 366 ; protective coatings, 97 ; sponge. *See* Sponge Iron ; structural, surface preparation, 268 ; yielding and strain-ageing, 100
Iron Alloys, corrosion by surface discontinuity, 388 ; thermodynamics, 163
Iron–Aluminium Alloys, superlattice structures, 386
Iron–Aluminium–Nickel Alloys, microscopical study, 200
Iron Carbide, decomposition in cast iron, 261
Iron–Carbon Alloys, weldability, 96
Iron–Chromium–Molybdenum Alloys, sigma phase, 383
Iron–Chromium–Nickel Alloys, constitution, 200
Iron–Copper–Manganese Powders, pressing and sintering, 98
Iron–Copper Powders, pressing and sintering, 98
Iron–Manganese Alloys, 384 ; free-energy and metastable states, 200
Iron–Manganese–Carbon Alloys, 384
Iron–Nickel Alloys, equilibrium diagram 200 ; free energy and metastable states, 200 ; iron-rich, transformations, 281 (*Paper*) ; magnetic properties, 381 ; oxidation at high temperatures, 164
Iron–Nickel–Chromium Alloys, high-temperature scaling, 387
Iron Ore, agglomeration, 362 ; American situation, 361 ; briquetting, 154 ; determination of phosphorus in, 164 ; determination of quartz in, 164 ; fine, nodulizing with flue dust, 154 ; flotation, 93 ; geology, 361 ; Lake, 362 ; Minas Geraes, economics, 391 ; mine conveyor systems, 362 ; mine drainage, 362 ; mining at Iron Mountain, 154 ; mining in Vizcaya, 362 ; nodulizing with flue dust, 154 ; nodulizing with limestone, 154 ; preparation at Colorado Fuel and Iron Corp., 154 ; preparation at Geneva Steel Co., 154 ; preparation at Kaiser Works, 154 ; preparation and sintering at Tennessee Coal, Iron and Railroad Co., 154 ; preparation in Spain, 362 ; reducibilities, 365 ; reducibility study, 366 ; reduction in electric furnaces, 365 ; sintering, 154 ; sintering trials in Spain, 93 ; titaniferous, concentrating, 362 ; transport across Great Lakes, 362
Iron-Ore Deposits, Brazil, 93 ; Dominica, 361 ; Philippines, 361 ; Portugal, 93 ; Spain, 361 ; Venezuela, 93
Iron Oxide Materials, reducibilities, 365
Iron Powders, effect of oxygen, 376 ; jet-engine compressor blades, 99 ; pressing and sintering, 98
Iron–Silicon Alloys, incremental magnetic properties, 381 ; magnetic properties, 381
Iron–Silicon–Carbon Alloys, carbon-equivalent considerations, 377
Iron–Silicon Sheet, anisotropy, 161
Iron and Steel Industry, British, 391 ; British, directory, 101 (*Book*) ; French, organization and production, 390 ; personnel handbook, 103 (*Book*) ; Spanish history, 165

Iron and Steel Making, thermodynamics of compounds between oxides, 213 (*Paper*)
Iron and Steel Works, heat economy, 25; lighting, 166; machinery, 264; personnel training, 103 (*Book*), 166; traffic analysis, 349; traffic communication by radio, 349
Ironmaking, Brazilian history, 390; direct, costs in Brazil, 366; direct-reduction processes, 155; history, 390; Madaras process, 366; without coke, 366
Isotopes, radio-active. *See* Radio-Active Isotopes
Italy, scrap situation, 165; spectrographic analysis, 164

Jackson Industries Inc., foundry, 371
Jet Engines, compressor blades from iron powder, 99
Jones and Laughlin Steel Co., air conditioning slag-crane cabs, 265; coke-oven rehabilitation, 155; E steel, 94

Kaiser Steel Corp., open-hearth roof-life index, 364
Keystone Steel and Wire Co., blooming mill, 264
Koninklijke Nederlandsche Hoogovens en Staalfabrieken, N.V., soaking-pit and mill equipment, 372
Kryptol Furnace, 157

Laboratories, hazards from chemicals, 390; foundry, 372
Laboratory Furnaces, Kryptol, 157
Ladles, hot-metal, stress analysis, 265
Lanarkshire Steel Co., Ltd., production of steel plates, 33
Lattice Structure, formation of superlattice, 386
Lead, determination in copper-plating baths, 268; determination in spelter by spectrography, 164
Lighting in Iron and Steel Works, 166
Liquid Fuels, modern applications, 272 (*Book*)
Liquid Iron, temperature determination by optical means, 257
Liquid Metals, bath-temperature measurement, 258; degassing, 157; penetration into compacted sand, 1 (*Paper*), 256 (*Corrigendum*)
Liquid Steel, temperature measurement in furnace, 147 (*Paper*)
Low-Alloy Steel, boron-containing, 193; eutectoid-zone thermodynamics, 163; heat-resisting, 162; properties up to 700° F., 382; temper brittleness, 100; weldability, 96
Lubricants, 96, 158, 373; bearing greases, 158; cold-drawing, 158; cold-drawing, Banox, 158; drawing, 96; wire-drawing, 96
Lubrication, 96, 158, 373; boundary, chemical aspects, 373; metallic wear, 373; thin-film, 373
Lustron Corp., steel-housing parts production, 268
Lynchberg Foundry Co., ductile cast-iron production, 368

Machinability, 159; annealing for, 157
Machining, 159; constant-pressure lathe, 159; E steel, 94; hot, 159; MX steel, 94; raw-materials form, 159
Madaras Ironmaking Process, 366
Magnaflux Inspection Method, of turbine parts, 162
Magnesium, addition to cast irons, 261; determination in nodular iron, 389; determination in nodular iron by spectrography, 389; in production of nodular iron, 261
Magnetic Cores, properties and tests, 381
Magnetic Crack Detection, fluid developed by Metropolitan-Vickers Electrical Co., Ltd., 381
Magnetic Phases, metallographic identification, 385
Magnetization, energy loss in magnetic sheet, 381
Magnetostriction, anisotropic permanent-magnet alloys, 381
Malleable Iron, determination of combined carbon in, 165
Malleable-Iron Furnaces, annealing, 369
Manganese, determination in steel by spectrography, 164
Manganese Ore, manganese recovery from low-grade, 93
Manganese-Ore Deposits, Mexico, 93
Manganese Steel, austenitic, 384; tool welding, 374
Marforming, 96
Martin (Glenn L.) Co., Marform process, 96
Measurement, 102 (*Book*)
Meerschaum, Turkish deposits, 361
Metal Films, optical constants, 375
Metal Slag Equilibria, ionic theory, 169 (*Paper*); ionic-theory applications to basic open-hearth process, 289 (*Paper*)
Metallizing. *See* Spraying
Metallography, 163, 268, 384; electrolytic polishing, 270; steel and alloy steel, 384
Metallurgical Industries, accountancy, 166; in Argentina, 390; equipment, 370
Metallurgical Terms, inter-lingual definitions, 391
Metallurgists, occupational analysis, 166
Metallurgy, historical developments, 390
Metals, anisotropy after annealing, 99; fatigue, 100; fluidity, 371; fracture theories, 268; liquid. *See* Liquid Metals; low-temperature behaviour, 162; physical-structure theories, 100; in service of mankind, 271 (*Book*); single-crystal preparation, 163; solidification, 371; weldability, 96
Metals and Alloys, low-temperature properties, 102 (*Book*)
Metropolitan-Vickers Electrical Co., Ltd., magnetic crack-detection fluid, 381
Mexico, manganese-ore deposits, 93
Meyer Hardness, 268
Michigan Steel Casting Co., precision casting, 370
Microscope, double, for determination of surface profiles, 159; high-temperature, 385; reflecting, 385; study of iron–aluminium–nickel system, 200
Microscope, Electron, co-operative investigation on steel, 385; metallurgical applications, 271; study of chromium–molybdenum steel, 163; study of quenched and tempered steel, 17
Microscope, Phase-Contrast, experience at National Physical Laboratory, 385; stop-contrast, 385
Mild Steel, brittle fracture, 268
Mild-Steel Plates, notch sensitivity, 268
Mine-Hoist Ropes, corrosion, 387
Mineral Resources, 93, 361
Models, open-hearth, 186; open-hearth, gaseous mixing in semi-venturi designs, 235 (*Paper*); side-blown-converter, 186
Molybdenum, determination in steel by colorimetry, 389; effect on steel fluidity, 262
Monarch Machine Tool Co., constant-pressure lathe, 159
Morris Motors, Ltd., Rotodip and Rotospray cleaning and finishing, 98
Moulding, time-and-motion study, 370
Moulding Machines, squeeze-piston size, 370
Moulding Sand, compacted, penetration of molten metal, 1 (*Paper*), 256 (*Corrigendum*); composition and properties, 369; composition and service conditions, 369; high-temperature characteristics, 263; inspection, 369; properties in relation to *p*H, 263; standardization, 263; steel-foundry, 369; synthetic, 369; synthetic, addition of powdered charcoal, 369
Moulds, design for steel castings, 261; drying ovens and practice, 370; ingot. *See* Ingot Moulds

National Farm Machinery Co., Inc., foundry, 371
National Physical Laboratory, phase-contrast microscopy, 385
Nephelometric Analysis, 165
Nickel, determination of phosphorus in, 389; effect in steel castings, 383; effect on steel fluidity, 262; in retardation of austenite, 384
Nickel Plating, batch production, 160
Nickel-Plating Baths, determination of cobalt in, 268; determination of sulphates in, 164; fluoborate, 267
Nickel Steel, classification, 384
Niobium, effect on impact resistance of steel, 382; effect in steel castings, 383
Nitrogen, determination as aluminium nitride, 164
Nodular Cast Iron, determination of magnesium by spectrography, 389; determination of retained magnesium in, 389; magnesium available after desulphurization, 261; production, 261; production and properties, 368; production in Hungary, 261; symposium, 261
Non-Destructive Testing, supersonic and X-ray applications, 269
Non-Metallic Inclusions, research in Czechoslovakia, 270
Normalization, furnace, 264

Obituary Notices, 358
Oil Fuel, modern applications, 272 (*Book*)
Oliver Corp., core ovens, 370; ploughshare production, 372
Open-Hearth Furnace, basic, logs of two spring-steel heats, 366; chromium recovery from scrap, 156; control of melting, 156; oil-fired, combustion study, 259; rebottoming, 259; replacement of silica brick by chrome-magnesite, 364; roof-life index, 364; silica roof bricks, 364
Open-Hearth Models, 186; gaseous mixing in, 186; gaseous mixing in semi-venturi designs, 235 (*Paper*)
Open-Hearth Plant, electrical equipment, 265
Open-Hearth Process, basic, applications of ionic slag/metal equilibria theory, 289 (*Paper*); desulphurization, 300; duplexing with electric furnace, 262
Ore Deposits, Brazil, 361; Phillipines, 361
Ores, determination of iron by spectrophotometry, 164; mining and treatment, 93, 154, 362; titaniferous, 362
Organic Coatings, salt-spray tests, 389
Osmond (Floris), contributions to study of allotropy in iron, 390; life and work, 390
Overvoltage, electrolytic polishing baths, 97
Oxidation, reaction kinetics in high-temperature scaling, 386
Oxy-Acetylene Flames, in descaming, 159; in heating, etc., of structural steel, 267; in scarfing, 266
Oxygen, in American acid-electric practice, 262; effect on iron powder, 376; in high-chromium electric melts, 259; in stainless steel electric melts, 260
Oxygen-Enriched Air, in basic converter, 156, 259; converter tests, 259; in cupola/converter process, 262; effect on industrial-gas combustion, 257
Oxygen Lance, in electric-furnace practice, 261

Paints, damage with reference to corrosion, 389; silicone, 268; testing, 268

Patternmaking, castings-distortion allowance, 369; equipment, 369; use of aluminium, 369
Penetration of Molten Metal Into Compacted Sand, 1 (*Paper*), 256 (*Corrigendum*)
Permali Bearings, 158
Permanent-Magnet Alloys, magnetostriction, 381; properties and applications, 381
Permanent Magnets, casting, 370
Phase-Contrast Microscope, at National Physical Laboratory, 385; stop-contrast, 385
Phenix Works, S.A., sheet-mill buildings, 159
Phillipines, ore deposits, 361
Phosphorus, control in cupola/converter process, 262; determination, 389; determination in iron ore, 164; determination in steel by spectrography, 118 (*Paper*), 164; effect on steel toughness, 161; segregation study by Cellophane prints, 271
Photoelastic Analysis, stress in shaft keyways, 379
Photomicrographs, metallurgical, exhibition, 384
Pickling, 96, 160, 267, 375; action of inhibitors, 96; surface-cleaning processes, 375
Pickling Liquor, treatment, 267; utilization, 375
Pig Iron, Brazilian classifications, 269, 384; dephosphorization by soda, 321; direct-reduction costs in Brazil, 366; production in Brazil, 155; production by Madaras process, 366; production in Minas Geraes region of Brazil, 391; production in small electric furnace, 259
Pipelines, buried, cathodic protection, 389
Pipes, preparation for bitumen coating, 375; seam-welded production, 96; spun-iron, corrosion, 388; stainless steel seamless, production, 158
Piston Rings, casting grey-cast-iron, 370; centrifugal casting, 370
Plastic Bending, 100
Ploughshares, production, 372
Polarographic Analysis, potential/current-density relationship, 165; routine apparatus for metallurgical applications, 165
Portugal, iron-ore deposits, 93
Powder Metallurgy, 98, 160, 375; bearings, 99; boundary stresses in compression, 98; for calculating-machine parts, 99; developments, 98; dilatometric study of sintering, 99; effect of powder impurities, 376; engineering applications, 98, 99; helical gears, 99; for intricate component, 99; iron, effect of oxygen, 376; jet-engine compressor blades, 99; precision, 98; pressing and sintering, 98; principles, 375; rupture-test evaluation of stainless steel powder, 98; sintering processes, 375; sintering theory, 160; stainless-steel parts, 376; testing parts, 99; tolerances of finished parts, 376
Precision Casting, lost-wax process, 370; *see also* Investment Casting
Presses, extrusion, for tubes, 373; horizontal, at W. H. Allen, Sons, and Co., Ltd., 158
Pressing, 95, 158, 264, 372; Marforming, 96
Probolog, 162
Pulleys, casting, 157
Pumps, oil, spindle-fracture analysis, 379
Pyrometers, optical, in liquid-iron-temperature determination, 257

Quality Control, castings, 260; electric steel, 367; in steel foundries, 371; steelplant products, 100
Quartz, determination in iron ore, 164
Quench-Cracking, gun steels, 161
Quenched and Tempered Steel, tensile-strength determination from chemical composition, 99
Quenching, slack, 158

Radio-Active Isotopes, in determination of blast-furnace gas-transit times, 315; industrial applications, 391; in metallurgical research, 166
Radiography, castings, 382; in foundry, 382; gamma compared with X-ray, 382; industrial, 269
Rails, tramway, welding tests, 159; web fatigue and corrosion-fatigue testing, 379
Recorders, glass pens, 94
Refractory Materials, 155, 364; cupola, 260, 365; cupola, application with compressed-air gun, 260; cupola, burn-outs prevention, 260; for cupola linings, 155; foundry, 364; reaction of refractory-oxide mixtures at high temperatures, 155
Refractory Materials (Carbon), in blast-furnaces at Appleby-Frodingham, 122
Refractory Materials (Chrome-Magnesite), behaviour in electric-furnace roofs, 364; comparison with silica brick in open-hearth, 364
Refractory Materials (Dolomite), stabilized, in cupola linings, 155
Refractory Materials (Magnesite), Turkish deposits, 361
Refractory Materials (Silica Brick), for arc-furnace roofs, 364; for open-hearth roofs, 364; replacement by chrome-magnesite in open-hearth, 364
Reheating Furnaces, temperature measurement, 94, 258
Republic Steel Corp., coking tests, 364; personnel training, 166
Research, boiler steels in Russia, 162; centrifugal casting, 370; deep-drawing, 158; human-performance measurement, 167 (*Book*); metallurgical, statistical applications, 100; non-metallic inclusions, 270; steel-valve, 269
Residual Stresses, in cylinder blocks, 377; determination, 269
Resistance Elements, cast iron for, 384
Rivets, partition of load, 379
Robertson (H. H.) Co., continuous zinc coating, 375
Robins-Messiter Ore-Reclaiming System, at Colorado Fuel and Iron Corp., 154; at Geneva Steel Co., 154
Rocket Motors, heat flow in walls, 269
Rockwell Hardness, determination, 380; determination from correlation curves, 380
Rod, wire, production, 264
Rolling, 158, 264, 373; cold, 264; cold, compression test, 305; theory and experiment, 102 (*Book*)
Rolling Mills, 158, 264, 373; American practice, 158; blooming, coupling repair by flame cutting, 159; blooming, at Keystone Steel and Wire Co., 264; buildings, 159; continuous, 373; continuous-tube, 158; housing casting, 370; Permali bearings, 158; plate, 46; power curves, 373; production efficiency, 373; rod, at Colorado Fuel and Iron Corp., 158; roll-pressure calculation, 373; Sendzimir, 373; slabbing, in production of steel plates, 40; strip, motors, 264; waste-water purification, 100
Rolls, wear testing, 380
Rotodip Cleaning Process, 98
Rotospray Finishing Process, 98
Rupture Testing, 385; of stainless steel powder, 98
Russia, boiler-steel research, 162; metallurgical-industry organization, 165
Rust Films, electrochemical activity, 388
Ruston and Hornsby, Ltd., mechanized foundry, 371

Saint Pierre-des-Corps Works, infra-red core heating, 370
Salicylaldoxime, in spectrophotometric determination of iron in ores, 164
Salt Baths, heating, 160; quenching power, 157
Salt-Spray Tests, 389
Scaling, high-temperature kinetics, 386
Scarfing, oxy-acetylene, 266
Scotland, production of steel plates, 29 (*Paper*), 360 (*Corrigendum*)
Scrap, chromium-contaminated in open-hearth, 156; cutting by Oxweld blowpipe, 266; situation in Europe, 165
Screws, cold heading, 95
Segregation, mechanism, 386
Sendzimir Rolling Mill, 373
Shafts, stress in keyways, 379
Shearing, power requirements, 264
Sheet, anisotropy in cold-reduced, 161; bulge testing, 161; magnetic, energy losses in magnetization, 381
Sheet Steel, effect of copper, 383; magnetic loss, 381; production, 372; thickness measurement with flying micrometer, 158; tin and tin–zinc coated, welding, 266; welding, 266
Ships' Bottoms, anti-corrosive compositions, 387
Shot Blasting, forgings, 160
Shot Peening, cast steel shot, 97; cut-wire shot, 97
Shovel Buckets, welding, 266
Sigma Phase, in austenitic chromium–nickel steel, 383; effect of heat-treatment, 162; formation in chromium steel, 383; X-ray study in alloy systems, 383
Silicon, determination in steel by spectrography, 164; distribution in freezing hypo-eutectic cast iron, 303 (*Paper*)
Silicone Paints, 268
Single Crystals, preparation, 163
Sinter, reducibility studies, 365
Sintered Carbide, hard, 376
Sintering, Holmberg process, 363; sulphide iron ores, 154; in Sweden, 363; at Tennessee Coal, Iron and Railroad Co., 154; trials in Brazil, 363; trials in Spain, 93, 362
Sintering Plant, Brazil, 363; electrical equipment, 362
Slag/Metal Equilibria, ionic theory, 169 (*Paper*); ionic-theory applications to basic open-hearth process, 289 (*Paper*)
Slags, basic, ionic composition, 171; blast-furnace granulated, for cement production, 259; blast-furnace, phosphorus enrichment, 259; cupola, action on linings, 155; cupola, high-alumina, 260; steelmaking, spectrochemical analysis, 273 (*Paper*); treatment and use, 259; viscosity and fusibility, 368
Soaking Pits, 372; at Allegheny Ludlum Steel Corp., 372
Société Arbed, sheet-mill buildings, 159
Société Ferblatil, sheet-mill buildings, 159
Société Métallurgique de Normandie, tests on quicklime charging in blast-furnace, 258
Sodium Carbonate, desulphurization of cupola iron, 260
Sodium Hydride, in descaling, 375
Solidification of Ingots, mechanism, 27
Sorbo-Mat Cast Iron, 368
Spain, history of iron and steel industry, 165; iron-ore deposits, 361; iron-ore mining at Vizcaya, 362; iron-ore preparation, 362; sintering trials, 93, 362; square tubes in welded construction, 158; welding conference, 96
Special Steels, deseaming by oxy-acetylene blowpipe, 159; high-temperature, 383; production in Brazil, 367
Spectrochemical Analysis, slags, 273 (*Paper*)
Spectrographic Analysis, determination of carbon in steel, 389; determination of magnesium in nodular iron, 389; in determination of phosphorus in steel, 118 (*Paper*); direct and graphic, 165; effect of spark source on lines,

Spectrographic Analysis—*continued*
165; in Italy, 164; line-breadth method, 165; plate calibration method, 165; source-unit behaviour, 329 (*Paper*); source-unit contribution to variability, 325 (*Paper*); steel, 164; steel, cast iron, and zinc, 165; steel and spelter, 164; tungsten steels, 165
Spectrum Analysis, direct-recording apparatus, 164
Spelter, analysis by spectrography, 164
Sponge Iron, production in Brazil, 366; production economics, 366; production in Sweden, 155
Spraying, metal, processes, 389; zinc and aluminium, 98
Spring Steel, elastic limit of strip during bending, 99; logs of two open-hearth heats, 366
Stainless Steel, austenitic, hardening by low-temperature working, 382; brazing with silver alloy, 266; cladding welding, 266; colouring, 267; corrosion resistance of welds, 163; electrolytic polishing, 96; forging, 95; grinding and surface finishing, 160; linings, 97; oxygen cutting, 266; pipe and tube production, 158; production, 260; production with oxygen in arc furnace, 260; satin finishing, 160; stress-corrosion tests, 389; weld-metal constitution diagram, 266
Stainless Steel Parts, production by powder metallurgy, 376
Stainless Steel Powders, rupture-test evaluation, 98
Stamping, 95, 158, 264, 372; developments, 95; dies, 158; machine guides, 373; spacing between blanks, 373; welded joints, 265
Statistics, in metallurgical research, 100
Steam Turbines, wear, 379
Steel, A52 welded-structure tests, 159; aircraft, fatigue limits, 161; alloy. *See* Alloy Steel; analysis by spectrography, 164, 165; analysis by spectroscopy, 164; austenite transformation, 163, 386; Bessemer. *See* Bessemer Steel; boiler, research in Russia, 162; brazing fluxes, 159; carburization by charcoal, 157; cast. *See* Cast Steel; chromium. *See* Chromium Steel; clad. *See* Clad Steel; coating with aluminium, 267; copper-bearing, corrosion resistance, 389; corrosion by H_2S air mixtures, 387; corrosion protection in underwater service, 387; corrosion in sea water, 123 (*Paper*); cupping, 264; deoxidation, 156; determination of aluminium nitride in, 164; determination of arsenic in, 164; determination of carbon in, 113 (*Paper*); determination of carbon by induction-combustion method, 271; determination of carbon by spectrography, 389; determination of copper by photometry, 164; determination of hydrogen as aluminium nitride in, 164; determination of hydrogen by Brown's method, 164; determination of molybdenum by colorimetry, 389; determination of phosphorus by spectrography, 118 (*Paper*); determination of sulphur by induction-combustion method, 271; ductility, 161; E, machinability, 94; effect of austenitic grain-size, 376; effect of grinding on fatigue strength, 380; effect of molybdenum on fluidity, 262; effect of nickel on fluidity, 262; effect of niobium on impact resistance, 382; effect of phosphorus on toughness, 161; effect of structure on hot strength, 162; elastic limit, 160; electrolytic polishing, 267; electron microscopy, 385; eutectoid-zone thermodynamics, 163; flake prevention, 269; fluidity, 262; grain-growth control by aluminium, 368; graphitic, 384; hardening, 372; heat-resistant. *See* Heat-Resisting Steel; high-speed. *See* High-Speed Steel; history and
Steel—*continued*
processes, 272 (*Book*); hydrogen in, 383; hypo-eutectoid, effect of composition on transformation, 386; identification of aluminium nitride, 271; low-alloy. *See* Low-Alloy Steel; MX, machinability, 94; manganese. *See* Manganese Steel; metallography, 384; micrographic-texture classification, 385; mild. *See* Mild Steel; nickel, classification, 384; non-metallic inclusions. *See* Non-Metallic Inclusions; pickling inhibitors, 96; production, 94, 156, 259, 366; production in Argentina, 366; protective coatings, 97; SAE X-1025, 366; sheet. *See* Sheet Steel; special. *See* Special Steels; spring. *See* Spring Steel; stainless. *See* Stainless Steel; strength tests, 161; stress-rupture tests, 382; structural. *See* Structural Steel; temper brittleness, 264; temperature measurement in billet-heating furnaces, 94; tin-coated welding, 266; tool. *See* Tool Steel; transformer. *See* Transformer Steel; tungsten. *See* Tungsten Steel; weldability, 96; welding, 96
Steel Castings, effect of niobium and nickel, 383; electric-furnace production, 262; flasks and rigging, 369; mould design, 261; production, 369; production by open-hearth/electric-furnace process, 262; quality control, 371; segregation, 261; in welded assemblies, 261
Steel Company of Canada, electrolytic tinning, 375
Steel Company of Scotland, Ltd., production of steel plates, 32
Steel Company of Wales, Ltd., melting shop at Abbey Works, 159
Steel Foundry, American productivity, 262; British practice, 157; developments in practice, 157; melting costs, 262
Steel Plates, production in Scotland, 29 (*Paper*), 360 (*Corrigendum*)
Steel Products, house-construction, 268; quality control, 100
Steel Strip, annealing furnace, 263; thickness measurement with flying micrometer, 158; zinc coating, 375
Steel Tubes, bituminous-coating behaviour under bending stress, 98
Steel Wire, isothermal hardening, 263; heating for patenting, 263; plastic strain and hysteresis, 319
Steelmaking, developments, 94
Steelworks, accident prevention, 166; Koninklijke Nederlandsche Hoogovens en Staalfabrieken, N.V., 372; melting shop at Abbey Works, 159; melting-shop frames, 85; overhead-crane travel - motion performance, 246; small, 367; waste treatment, 267
Strain, dynamic, recording equipment, 379; energy losses and fracture, 379; oscillographic recorder, 378
Strain-Ageing, effect on electrical resistance of iron, 322; of iron, 100
Strain Gauges, electrical-resistance, 377, 378; in stress determinations, 100
Strains, photographic-recording apparatus, 100
Stress Analysis, cast-iron valve assembly, 378; electrical-resistance gauges, 377, 378; hot-metal ladles, 265; photo-elastic, in shaft keyways, 379
Stress Corrosion, tests on supercharger material, 389
Stress Relief, welded structures, 158, 266
Stress-Rupture Tests, steel and Hastelloy, 382
Stress/Strain Relationships, biaxial stressing machine, 379; cast-iron beams, 378
Stresses, determination by brittle lacquers, 100; determination by strain gauges, 100; internal, determination, 163; internal, in surface hardening, 100; residual, in cylinder blocks, 377; residual, determination, 269; shear-
Stresses—*continued*
ing, 100; strain gauges, 100, 377, 378; tri-axial, 377
Structural Steel, oxy-acetylene-flame applications, 267; spot welding, 266; surface preparation, 268; tensile testing, 99; weldability, 96, 374
Sulphur, control in cupola/converter process, 262; determination by induction-combustion method, 271
Sulphuric Acid, determination in chromium-plating solutions, 164
Summers (John) and Sons, Ltd., annealing-furnace charging machine, 95
Supersonic Testing, crack detection, 381, 382; equipment, 269
Surface Finishing, stainless steels, 160
Surface Hardening, internal stresses, 100
Surface Preparation, structural iron and steel, 268
Surface Profiles, determination by double microscope, 159
Surface Reproduction, by photographic emulsion, 163
Sweden, foundry practice, 368; sintering, 363; sponge-iron production, 155

Temper Brittleness, low-alloy steels, 100; reduction, 264; transformation reversibility, 100
Temperature Distribution in Ingot Moulds, relation to ingot structure, 19 (*Paper*)
Temperature Measurement, in basic arc furnace, 257; bath, 258; Bessemer blow, 259; billets, 94; in converter, 257, 258; flames, 94; in heat-treatment and reheating furnaces, 258; in ingots, 71 (*Paper*); liquid iron, 257; liquid steel in furnace, 147 (*Paper*); steel in billet-heating furnaces, 94
Temperature Measurement and Control, 94, 257
Tempering, embrittlement of high-phosphorus steel, 161
Tennessee Coal, Iron and Railroad Co., ore preparation and sintering, 154
Tennessee Copper Co., sintering, 154
Tensile Strength, determination from chemical composition, 99
Tensile Tests, on drilled specimens, 99; effect of rate of loading, 268; effect of strain rate, 376; grey cast iron, 377; for high-temperature properties, 161; impact, effect of specimen size and shape, 376; miniature specimens, 376; necking fracture, 377; necking-rate study by high-speed cinematography, 376; reproducibility, 376; resistance to fracture, 99; specimen-volume decrease, 99; structural steel, 99
Testing, 99, 160, 268, 376; cast-iron engine parts, 377, 378; coal cleaning, 257; coal for cokemaking, 364; core mixtures, 369; heat-resisting steel, 382; lubrication, 373; moulding sands, 369; organic coatings, 389; paint, 268; polished specimens for hardness, 386; powder parts, 99; rail-web fatigue, 379; roll wear, 380; stainless steel powder, 98; steel strength, 161; tensile. *See* Tensile Tests; transformer steels, 381; weldability of steels, 374; welded-structure steels, 159; welded tramway rails, 159
Testing Machines, biaxial stressing, 379; deep drawing, 160; fatigue, 380
Tests, 99, 160, 268, 376; abrasion, 385; bend, ductile–brittle transition, 377; bulge, on sheet metal, 161; carburization, 157; compression in relation to cold rolling, 305; corrosion, 388; corrosion, on electrodeposited coatings, 270; corrosion, on wire, 270; corrosion, of wire ropes, 270; deep-drawing, 160; elastic-limit, 160; fatigue, committee report, 161; limit equation, 161; notch effect, 268; fatigue, on rail webs, 379; hardena-

Tests—*continued*
bility and grain-growth, 380; hardness, Meyer, 268; hardness, of polished specimens, 386; impact, on gun steel, 161; impact, pendulum-machine adaptation, 161; Jominy, 264; microhardness, 380; non-destructive. *See* Non-Destructive Testing; notched-bar, 268; rupture, 385; rupture, on stainless steel powder, 98; salt-spray, 389; strength of steels, 161; stress-corrosion, 389; stress-rupture, on steel and Hastelloy, 382; stress/strain, on cast-iron beams, 378; supersonic crack detection, 381, 382; tensile. *See* Tensile Tests; tensile-impact, effect of specimen size and shape, 376; wear, on cylinder and piston rings, 379; wear, on rolls, 380; wear, in steam turbines, 379; weldability, 374
Textile Machinery, stress/strain curves, 378
Thomas, Sidney Gilchrist, life, 165
Ticonal, properties, 381
Time-and-Motion Study, moulding unit, 370
Timken Roller Bearing Co., spectrometer electric-furnace control, 271
Tin-Coated Steel, welding, 266
Tin Research Institute, tin–zinc electrodeposition process, 98
Tin–Zinc Coated Steel, welding, 266
Tin–Zinc Coatings, electrodeposition, 98
Tinplate, electrolytic, 375; history, 165; production, 267
Titanium, effect on steel fluidity, 262
Tool Steel, graphitic, 162; hardenability and grain-growth resistance, 380; hardening and tempering, 94; hot working, 382
Tools, gas carburizing, 157; heat-treatment, 94; manganese-steel, welding, 374; repair by hydrogen-arc welding, 159; standardization, 100
Traffic of Iron and Steel Works, analysis, 349; high-frequency radio communication, 349
Transformer Steel, testing equipment, 381
Transformers, efficiency calculation, 265
Tubes, bituminous-coating behaviour under bending stress, 98; cold-drawing lubricants, 158; extrusion press, 373; gun, quench-cracking, 161; Probolog testing, 162; square, in welded construction in Spain, 158; stainless steel seamless production, 158; superheater, cracks, 269; welded, production, 374
Tungsten Steel, analysis by spectrography, 165; determination of phosphorus in, 389; pseudo-flakes, 384
Turbines, blade and bucket inspection, 162
Turkey, chromite, etc., deposits, 361

United States, acid-electric practice, 262; ferrous melting furnaces, 156; iron-ore flotation in Alabama, 93; iron-ore
United States—*continued*
situation, 361; Lake ores, 362; last hand-charged blast-furnace, 258; laws relating to industrial effluents, 267; Montana chromite deposits, 93; rolling-mill practice, 158; steel-foundry productivity, 262; wire industry, 264
United States Navy, centrifugal-casting research, 370
United Steel Companies, Ltd., carbon blast-furnace refractories, 122, 365

Vacuum Evaporation, metal-coating application, 267
Vacuum Melting, influence on chromium-alloy properties, 384
Vanadium, determination in alloy steels, 164
Vanadium Steel, determination of phosphorus in, 389
Venezuela, iron-ore deposits, 93

Water, rolling-mill waste purification, 100
Water Mains, corrosion phenomena, 387
Wean Engineering Co., hot-dip coil-galvanizing, 267
Wear, abrasive, 269; automobile-engine parts, 379; in Diesel engines, 379; dimensional considerations, 379; gear teeth, 379; process, 380; resistance of chromium plating, 267; in steam turbines, 379; tests on engine parts, 379
Weirton Steel Co., coke-oven rehabilitation, 155; continuous zinc-coating units, 375; rebottoming open-hearth, 259
Weld Metal, effect of cooling rate and composition on embrittlement, 105 (*Paper*); effect of electrodes on fissures, 107
Weldability, 96; effect of carbon, 96; iron–carbon alloys, 96; mild and low-alloy steel, 96; structural steels, 96, 374; tests, 374
Welded Assemblies, steel castings in, 261
Welded Structures, sheet-mill buildings at d'Espérance - Longdoz, S.A., 159; square tubes, 158; stress-relief, 158, 266; tests on A52 steel, 159
Welded Tubes, production, 374
Welders, testing qualifications, 159
Welding, 96, 158, 265, 374; arc, in Brazil, 374; arc, metal transfer, 265; arc, power supply, 265; argon-arc, 374; automobile parts, 159; Cadweld process, 266; copper to other metals, 266; current, 96; design and processes, 167 (*Book*); effect of methods on fatigue resistance, 159; flash, effect of consumption rates, 266; flash, heat-affected zones, 265; gas-shielded arc, 266; hydrogen-arc, in repair of tools and dies, 159; manganese-steel tools, 374; metal preparation, 159; modern technique, 166 (*Book*); oxy-acetylene, of cast iron,
Welding—*continued*
392 (*Book*); sheet steel, 266; shovel buckets, 266; Spanish conference, 96; spot, of structural steel, 266; spot, of tin and tin–zinc steel, 266; stainless-clad steel, 266; steel and cast iron, 96; theory survey, 374; underwater, 375
Welding Defects, cracking in forged flanges, 265
Welding Electrodes, 96; coated, 374; Danish classification proposals, 374; influence on weld-metal fissures, 107
Welding Machine, arc, for hard facing, 265
Welds, arc, cooling rates, 265; fractography, 269; micrographs, 384; stainless steel, constitution diagram, 266; stainless steel, corrosion resistance, 163; statistical analysis, 265
Westinghouse Electric Corp., tool standardization, 100
White Cast Iron, influence of knock-out temperature on graphitization, 156
Wire, corrosion tests, 270; heating and cooling rates, 372; production, 264; steel, heating for patenting, 263; steel, isothermal hardening, 263; steel, plastic strain and hysteresis, 319
Wire Drawing, die standardization, 373; lubricants, 96; mathematical study, 96
Wire Industry, American, 264
Wire Ropes, lay to prevent crossing at contact points, 271; lays, 271; mine-hoist, corrosion, 387; wear determination by electromagnetics, 162
Wood (Alan) Steel Co., coke-oven repairs, 155; rolling-mill waste-water purification, 100
Workington Iron and Steel Co., employees' handbook, 103 (*Book*)

X-Ray Diffraction, Geiger-counter spectrometer, 269
X-Ray Studies, iron–nickel system, 200; sigma phase in alloy systems, 383; temper brittleness in low-alloy steels, 100
X-Ray Stress Analysis, 269
X-Rays, metallurgical applications, 382; test equipment, 269

Yielding, of iron, 100
Young's Modulus, determination, 162; effect of temperature, 162

Zinc, analysis by spectrography, 165; occurrence with iron, 100; spraying, 98
Zinc Coatings, continuous units, 375; corrosion, 270; Wean Titecote process, 375
Zinc-Plating Solutions, addition agents, 98
Zirconium, determination in zirconium and ferrozirconium, 165

NAME INDEX

Abel, P. J., large-diameter-pipe production, 96
Aber, W. C. *See* Templin, R. L.
Acera, L. H., hardening, 380
Achard, decarburization in basic-arc furnace, 260
Aites, W. K., induction heating in analysis, 271
Alexander, A. L., and **T. P. May**, testing organic coatings, 388
Allen, A. H., investment casting, 370; selective hardening, 263
Allen, C. M., oil-film strength, 373
Allen, N. P., alloy systems, 202; corrosion and fracture, 268; mechanical properties of alloy steels, 193
Allen, N. P., and **C. C. Early**, *Paper*: "The Transformations α–γ and γ–α in Iron-Rich Binary Iron–Nickel Alloys," 281
Allott, G. W., obituary notice, 358
Almen, J. O., gear-teeth wear, 379
Altamira, R., high-temperature alloys, 382
American Foundrymen's Society, core-mixture testing, 369; rat-tail casting defects, 371
American Society For Testing Materials, report on fatigue, 161; report on impact testing, 161
Amine, D. *See* Darmois, E.
Ancion, G., flame cutting, 159
Anderson, A. E., and **R. H. Lundquist**, flame hardening, 157
Anderson, J. S., electrodeposits, 97
Andrade, E. G. de. *See* de Andrade, E. G.
Andrés, M. P. *See* Velayos, S.
Andrews, K. W., alloy systems, 203
Angus, H. T., open-hearth models, 190
Arbel, C., relationship between deep-drawing and tensile properties, 160
Argobast, A. H., and **J. E. Gold**, steelplant wastes, 267
Arkos, F., iron-ore direct-reduction processes, 155
Armesto, D. C., electric welding, 96
Arnal, T. G. y, and **J. M. Liceaga**, thermal decomposition of ferrous sulphate, 390
Arndt, U. W. *See* Hall, W. H.
Arnold, P. C., welding stainless-clad steel, 266
Arsdell, M. van. *See* van Arsdell, M.
Ash, E. J., foundry mechanization in Argentina, 371
Astbury, N. F., **T. Emmerson**, and **J. McFarlane**, testing transformer steels, 381
Atkins, W. S., structural frames for melting shops, 86
Atterton, D. V., biographical note, 91; *see also* Hoar, T. P.
Aubry, J., and **G. Turpin**, estimation of free quartz in iron ore, 164
Audubert, R., **M. Bonnemay**, and **E. Lewartowicz**, overvoltage in electrolytic polishing, 97
Azevedo, R. F. de. *See* de Azevedo, R. F.
Aznar, L. B., weldability, 374; weldability of structural steels, 96

Babo, H. von. *See* von Babo, H.
Baen, S. R. *See* Duwez, P.
Baer, H., gas states in pipelines, 257
Bagsar, A. B., notch sensitivity, 268
Bailey, R. W., creep fractures, 269
Bannister, B., seamless-pipe production, 158
Barbadillo, F. *See* Millan, F.
Barczak, A. D., metal losses in foundry, 260
Bardell, P. R. *See* Richards, C. E.
Bardgett, W. E., biographical note. *Frontispiece*
Bardgett, W. E., and **L. Reeve**, *Paper*: "Mechanical Properties of Low-Carbon, Low-Alloy Steels Containing Boron." *Discussion*, 193. *Correspondence*, 198. *Authors' Reply*, 199.
Barlow, T. E. *See* Dunbeck, N. J.
Barr, A. E. De. *See* De Barr, A. E.
Barr, W., brittle fracture of mild steel, 268
Barreiro, L., iron-ore mining in Vizcaya, 362; scrap situation in Europe, 165; tinplate-manufacture history, 165
Barret, H., chrome-magnesite bricks, 364
Barret, P., flame-temperature measurement, 94
Barrett, E. P., and **C. E. Wood**, reducibilities of iron oxides, 365
Barrett, H. N., bottom installation in large open-hearth, 259
Barros, C. de R., and **V. L. Ré**, gamma radiography, 382
Barrow, A. H. E., electroplating jigs, 267
Bashforth, G. R., control of arc-furnace electrodes, 367
Bastian, E. L. H., drawing lubricants, 96; wire-drawing lubricants, 96
Bastos, N. L. *See* de Carvalho, H. G.
Bates, F. E., desulphurizing cupola iron, 260
Bauscher, J. A. *See* Lankford, W. T.
Beck, W., vibration tests on bitumen-coated pipes, 98
Beeghly, H. F., determination of aluminium nitride nitrogen, 164
Belaiew, N. T., work of Floris Osmond, 390
Bellew, G. E., oxygen in arc furnace, 261
Bénard, J., oxidation, 386
Bénard, J., and **J. Moreau**, high-temperature oxidation of iron–nickel alloys, 164
Bennett, M. G., traffic of iron and steel works, 351
Berg, P. J., blast-furnace-gas-fired boilers, 265
Berkovich, E. S., double microscopes for surface studies, 159
Bernot, J., Kryptol furnace, 157
Bever, M. B. *See* Rengstorff, G. W. P.
Bhaduri, B. N., plate calibration of spectrograms, 165
Bielau, K., hardening, 372
Biernacki, J., testing welders, 159
Biernacki, L., radio-active isotopes, 391
Biers, H., high-top-pressure operation in blast-furnaces, 259
Billstein, A. E. F. *See* Code, C. J.
Binaghi, R., corrosion by surface discontinuity, 388
Binder, W. O., effect of niobium on impact resistance at elevated temperatures, 382
Binyon, E. O., conveyor systems in iron-ore mines, 362
Birch, N. A., sheave casting, 369
Birge, G. W. *See* Davis, J. D.
Bishop, H. F., segregation in small steel castings, 261
Bleloch, W., carbonated blast in blast-furnaces, 365
Blok, H., gear-teeth lubrication and wear, 374
Bloom, F. S., steel-temperature measurement, 94
Bocciarelli, F., cast-iron inoculation, 369; standardization of Brazilian pig irons, 384; *see also* Moraes, M. A., Rocha, M. R.
Bock, W. K. *See* Schwartz, H. A.
Bond, D. C., and **G. A. Marsh**, corrosion in H_2S air mixtures, 387
Bondy, O., melting-shop structures, 87
Bönig, H., foundry safety and hygiene, 372
Bonnemay, M. *See* Audubert, R.
Booth, B. H., effect of moisture on bentonite strength, 262; effect of *p*H on moulding sands, 263
Booth, M. O., quality control in foundry, 261
Bornstein, H., strain-gauge testing gear casting, 378
Bostem, H., obituary notice, 358
Bowden, F. P., and **D. Tabor**, boundary lubrication, 373
Boyer, H. E., heat-treatment furnaces, 94
Brace, A. W., cold-rolling compression test, 311
Brace, P. H. *See* Ziegler, N. A.
Brachet, magnetic determination of plating thickness, 160
Bradaschia, C., basic-electric practice, 367; dephosphorization in basic electric furnace, 367; ferromanganese alloys, 384
Bradley, A. J., *Paper*: "Microscopical Studies on the Iron–Nickel–Aluminium System." *Discussion*, 200. *Correspondence*, 206. *Author's Reply*, 212
Braidwood, W. W., and **A. D. Busby**, nodular iron, 261
Bramhall, W. *See* Pearce, J. H.
Bramley, L. N. *See* Wise, D. A.
Brandt, D. J. O., open-hearth models, 191
Brauns, E., sintering in Sweden, 363
Braybrook, A., and **D. Hadfield**, cast permanent magnets, 370
Brearley, A. C., foundry melting practice, 262
Breckpot, R., and **C. Gobert**, determination of carbon, 389
Bremer, E., mass-production foundry, 371
Brenner, A. *See* Ogburn, F.
Brewer, G. A., strain-gauge testing cast-iron press frames, 378
Brewer, R. E. *See* Davis, J. D.
Brinkley, J. R., rail traffic, 353
Brisby, M. D. *See* Mardon, H. H.
British Coke Research Association, coking-coal testing, 364
British Iron and Steel Research Association, Fuel Research Committee. *Paper*: "Some Methods of Calculating Internal Temperatures From Surface Temperatures of Ingots," 71; Ingot Surface Defects Sub-Committee Report, 367; Joint Technical Panel N/P2, anti-corrosive compositions for ships' bottoms, 387; Spectrographic Analysis Sub-Committee, *Paper*: "Contribution of the Source Unit to Variability in Spectrographic Analysis," 325
Broida, V., and **C. Henry**, heating, 258
Brosch, C. D., moulding sands, 369
Brosch, C. D., **D. Ferraresi**, and **H. C. Goncalves**, inspection of foundry sands, 369
Brosch, C. D., and **O. Longo**, gating, 369
Brosch, C. D., and **R. Mottin**, steel-foundry sands, 369
Broughall, J. A., electric cranes, 248
Broughton, H. H., cranes, 251
Brown, H., investment casting, 370
Brown, R. S., *Paper*: "Plastic Strain and Hysteresis in Drawn Steel Wire." *Discussion*, 319. *Author's Reply*, 320
Browne, L. E., normalizing gas cylinders 264
Brownstead, E. F., iron-ore/flue-dust nodulizing, 154
Brucelle, G., spectrum lines, 165

Bryan, F. R., G. A. Nahstoll, and **H. D. Veldhuis,** determination of magnesium, 389
Bücking, W. *See* Gummert, H.
Buckingham, E., and **G. J. Talbourdet,** roll-wear tests, 380
Buckley, S. E. *See* Richards, C. E.
Bühler, H., flame hardening, 372 ; induction hardening, 372
Burks, G. P., comparison of large and small blast-furnaces, 258
Burns, R. D. *See* Rees, W. P.
Burns, R. R., sintering, 154
Burwell, J. T., wear, 380
Busby, A. D. *See* Braidwood, W. W.
Buschmann, W., cold-rolled set screws, 95
Butler, G. B. *See* Saunders, H. L.
Bylund, K. G., and **H. Rudberg,** spectrum-analysis apparatus, 164
Byrns, H. A., fine-ore briquetting, 154

Caine, J. B., and **R. S. Haught,** slack quenching, 158
Cajado, C. E. V. *See* Melcher, G.
Calhoun, W. A., titanium and iron from bauxite, 362
Calnan, E. A. *See* Vernon, W. H. J.
Cameron, J. A., strain-gauge testing cast-iron trays, 378
Campbell, J. S., powder metallurgy, 375
Campbell, T. C., Venezuelan iron-ore deposits, 93
Carey, J. D., and **A. G. Pison,** testing powder-metal parts, 99
Cargill, D. A., cut-wire shot, 97
Carlander, A., flying micrometer, 158
Carlsson, C. G., biographical note, 357
Carlsson, C. G., and **J. T. M. Yü,** *Paper* : "Spectrochemical Analysis of Steel-making Slags," 273
Carlsson, O. *See* Hultgren, A.
Carmichael, E. S., and **R. C. Robinson,** bearing greases, 158
Carnegie, H. S., steelworks cranes, 249
Carpenter, E., dinking dies, 95
Carr, H., hot-working steels, 382
Carter, H. D., cobalt estimation in nickel-plating solutions, 268
Carter, P. T., sodium reactions in slags, 321
Carter, R. O., and **D. L. Richards,** magnetic properties, 381
Cartwright, W. F., steelworks cranes, 246
Carvalho, H. G. de. *See* de Carvalho, H. G.
Carwile, N. L. *See* Geil, G. W.
Cassan, H., coke-oven temperature control, 257
Caswell, J. S., cold-rolling tests, 310 ; resistance strain gauges, 100
Cattaneo, A. G., and **E. S. Starkman,** engine wear, 379
Cavallero, L., and **A. Indelli,** electrochemistry of corrosion, 388
Cazaud, R., fatigue of aircraft steels, 161
Ceano-Vivas, E. D.-V. y, tinplate, 267
Ceccantini, H. J. *See* Schwartsman, D. L.
Chalin, C. *See* Darmois, E.
Chambaud, fretting corrosion, 164
Chapman, H. A. *See* Mardon, H. H.
Chatfield, C. H., and **A. W. Swift,** silver-alloy brazing, 266
Cheradame, R., coal-cleaning tests, 257
Chesters, J. H., A. R. Philip, R. S. Howes, and **I. M. D. Halliday,** *Paper* : "Open-Hearth Furnace Models." *Discussion*, 186. *Correspondence*, 190. *Authors' Reply*, 191
Chiaverini, V., hard carbides, 376 ; heat-treatment, 372
Chipizhenko, A. I., determination of fracture resistance, 99
Chipman, J., deoxidation of steel, 156
Christensen, R. G., patterns, 369
Christian, D., strain-gauge recorder, 378
Christin, R. E. *See* Scheier, S. L.
Chudzinsky, J., powder metallurgy in mechanical engineering, 98
Churchman, A. T. *See* Cottrell, A. H.
Clark, A. P., structural frames for melting shops, 85
Clark, D. S., and **P. E. Duwez,** effect of strain rate in tensile testing, 376
Clark, D. S., and **D. S. Wood,** effect of impact-specimen size, 376
Clarke, J. S., open-hearth models, 187
Clews, C. J. B. *See* Vernon, W. H. J.
Clock, L. S. *See* Lipson, C.
Code, C. J., and **A. E. F. Billstein,** fatigue life of rail webs, 379
Coheur, P. *See* Marbais, L.
Coheur, P., and **A. Hans,** spectrum analysis, 165
Colclough, T. P., open-hearth models, 187
Coll, G., square tubes, 158
Collins, R. D., and **J. D. Tyler,** *Paper* : "Experiments in Gaseous Mixing in Open-Hearth Furnace Models. Part I." *Discussion*, 186. *Correspondence*, 190. *Authors' Reply*, 192 ; *Paper* : "Experiments on Gaseous Mixing in Open-Hearth Furnace Models. Part II," 235
Colpaert, H., macro- and micro-examination, 385
Comfort, G. B., air-compressor maintenance, 260
Comstock, G. F., low-alloy high-temperature steel, 162
Cook, A. J. *See* Rees, W. P.
Cook, E. L. *See* Hackerman, N.
Cooper, H. J., oxygen in arc furnace, 260
Cordiano, J. J., effects of oxides on compacts, 376
Cornet, oxygen-enriched blast in converter, 259
Corral, F. M. del. *See* del Corral, F. M.
Corson, M. G., fatigue limit, 161
Costa, E. L. F., Tysland-Hole furnace, 366
Costa, J. O., welding electrodes, 374
Cottrell, A. H., and **A. T. Churchman,** *Paper* : "Change of Electrical Resistance During Strain-Ageing of Iron." *Discussion*, 322. *Correspondence*, 323. *Authors' Reply*, 324
Coull, J. *See* Hoak, R. D.
Cousans, F., cupola/side-blown-converter process, 262
Cox, H. L., fatigue, 268
Cox, W. C. *See* Duguid, R. H.
Criner, H. E. *See* Driessen, M. G.
Crockard, F. H., iron-ore blending, 154
Crussard, C., alloy systems, 207
Curtiss, L. F., Geiger-Müller counters, 391
Czapski, F. A., foundry refractories, 364
Czygan, W., chromium plating, 97 ; waste-water purification, 100

Dadswell, C. J., British steel-foundry practice, 157
Danihelka, I., control of melting in open-hearth, 156
Darling, C. S., industrial-furnace control, 364
Darling, H. G., obituary notice, 358
Darmois, E., I. Epelboin, and **D. Amine,** electropolishing baths, 96
Darmois, E., I. Epelboin, D. Amine, and **C. Chalin,** electropolishing baths, 267
da Silva, J. M., iron-ore deposits in Portugal, 93
da Silva, L. C. C., hydrogen in steel, 383
Dastur, M. N., and **N. A. Gokcen,** emissivity of liquid iron, 257
Davies, E. C., steelworks cranes, 248
Davies, M., *Book* : "The Story of Steel," 272
Davis, E. W., American iron ores, 362
Davis, J. D., D. A. Reynolds, R. E. Brewer, W. H. Ode, B. W. Naugle, and **D. E. Wolfson,** Virginian coking coals, 364
Davis, J. D., D. A. Reynolds, B. W. Naugle, D. E. Wolfson, and **G. W. Birge,** Alabama coking coals, 364
Day, B. B., statistical analysis in welding, 265
Day, M. J. *See* Miller, O. O.
Dayton, R. W., thin-film lubrication, 373
de Andrade, E. G. *See* Feijo, A. H. da S.
Dearden, J., effects of boron, 198
de Azevedo, R. F., classification of Brazilian pig irons, 269
De Barr, A. E., magnetic anisotropy, 161
de Carvalho, H. G., N. L. Bastos, and **E. P. Franca,** sinter reducibility, 365
d'Entremont, B. H., welding, 96
De Grote, I. A. *See* Ensign, E. E.
Delbart, G., and **M. Ravery,** effect of microstructure on hot strength, 162 ; structure of chromium–molybdenum steel, 383
del Corral, F. M., thermodynamics of eutectoid zone, 163
del Moral, F., continuous mills, 373
DeLong, B. H., stainless steel, 260
de Milo, F. D. H., cupola yield, 368 ; foundry mechanization, 371 ; grey-iron transformations, 386
de Nardo, J. B., Madaras blast-furnace process, 366
Denison, I. A., underground corrosion, 389
Denison, I. A., and **M. Romanoff,** soil corrosion, 389
Denny, L. R. *See* Sloan, J. J.
Déribéré, M., core heating, 370
de Saint-Vaubry, R., iron-ore-mine drainage, 362
Desch, C. H., cold-rolling tests, 310 ; effects of alkalis on blast-furnace refractories, 321 ; strain in steel wire, 319
de Souza, F. J. P., sintering at Monlevade, 363
De Vaulchier, chromium plating, 160
de Witt, E. J., tubes, 374
Diamond, E. L., distribution in blast-furnace, 317
Diaz, J. S. y, Phillipine mineral resources, 361
Dickie, H. A., blast-furnace reactions, 317 ; drawn steel wire, 319 ; effects of boron, 194
Dickinson, T. A., dinking dies, 95 ; permanent-magnet production, 263
Didierjean, C., changes in steel-foundry practice, 157
Diepschlag, E., and **H. Müller,** damping, 382 ; special electric-furnace steels, 367
Dill, F. H., flame straightening, forming, and cleaning, 267
Dolan, T. J. *See* Sinclair, G. M.
Donald, Andrée, biographical note, 91 ; *see also* Mackenzie, I. M.
do Prado, L. C., alloy structure, 385
Doskář, J., carburizing mixtures, 157
Dove, A. B., coating processes, 389
Dovey, D. M., and **I. Jenkins,** controlled heat-treatment atmospheres, 263
Dowding, M. F., cold-rolling tests, 308
Draper, C. R., dust-extraction equipment, 375
Drew, R. L., reflecting microscope, 385
Dreyfus, L., inductive stirring, 94
Driessen, M. G., and **H. E. Criner,** coal-washing thickeners, 364
Duffy, E. J., iron-ore blending, 154
Duguid, R. H., and **W. C. Cox,** cyanide hazards, 157
Dulis, E. J. *See* Smith, G. V.
Dulis, E. J., and **G. V. Smith,** sigma phase in chromium–nickel steels, 383
Dunbeck, N. J., and **T. E. Barlow,** cupola patching, 260
Dunleavy, R. A., S. E. Wiberley, and **J. H. Harley,** photometric determination of copper, 164
Duran, L. A. y, powder metallurgy, 375
Durrer, R., electric iron-smelting furnaces, 365
Durst, Dorothy. *See* Mehlig, J. P.
Dustman, H. C., induction-heating equipment, 157
Duwez, P., and **S. R. Baen,** sigma phase in binary alloys, 383
Duwez, P., and **H. Martens,** dilatometry of compact sintering, 99
Duwez, P. E. *See* Clark, D. S.
Dwyer, P., mechanized foundry, 371
Dye, J. K., comparison of large and small blast-furnaces, 259
Dyke, R. M., Sorbo-Mat iron, 368

Earley, C. C., biographical note, 358 ; *see also* Allen, N. P.
Ebert, M. *See* Erbacher, O.
Edelboude, Permali bearings, 158
Edson, A. P., D. G. Paquette, and **I. L. Newell,** gaseous brazing fluxes, 159
Eichenberger, W. W., moulding-machine piston, 370
Eichinger, A., fatigue strength, 380
Eickhoff, A. J., surface preparation and painting, 268
Eisenkolb, F., effects of copper, 383
Eisermann. *See* Felix, W.
Ellinger, J. H., heat-transfer nomograms, 363
Elliot, G. D., carbon blast-furnace refractories, 365
Ely, R. J. *See* Flinn, R. A.
Emmanuel, G. N., sigma phase in chromium–nickel steel, 383
Emmerson, T. *See* Astbury, N. F.
Ensign, E. E., and **I. A. De Grote,** powder metallurgy, 98
Entremont, B. H. d'. *See* d'Entremont, B. H.
Epelboin, I. *See* Darmois, E.
Erbacher, O., W. Herr, M. Ebert, and **H. von Babo,** corrosion protection by noble-metal layer, 97
Erickson, M. A., strain gauges, 377
Eschelbach, R. *See* Werny, K.
Espey, G. *See* Sachs, G.
Espey, G. B., coil annealing, 263
Evans, C. T., jun., corrosion by coal ash, 387
Evans, E. L. *See* Sloman, H. A.
Evans, R. W., scrap melting in open-hearth, 190
Evans, U. R., corrosion cracking, 270

Fabriani, F., basic-electric steelmaking, 366 ; steel casting, 370 ; test correlations with grey iron, 377
Faist, C. A., and **C. Wyman,** oxygen-decarburized electric steel, 156
Farnsworth, J. F. *See* Russell, C. C.
Farrell, D. A., safety in iron and steel works, 166
Feder, Josephine C. *See* Fusfeld, H. I.
Fehling, H. R., open-hearth models, 188
Feijo, A. H. da S., S. M. L. Radino, and **E. G. de Andrade,** oil-pump spindle fracture, 379
Felix, W., and **Eisermann,** sigma phase in chromium–nickel steels, 162
Fergusson, H. B., and **P. L. J. Leder,** cracking of welded flanges, 265
Ferraresi, D. *See* Brosch, C. D.
Ferro, A. *See* Locati, L.
Finniston, H. M., E. R. W. Jones, and **P. E. Madsen,** Meyer hardness, 268
Fischer, R., oxygen in arc furnace, 259
Fisher, J. C., free-energy change in martensite transformation, 163
Fisher, J. C., J. H. Hollomon, and **T. Turnbull,** kinetics of austenite–martensite transformation, 163
Flickinger, C. H., and **J. P. Graham,** coking tests, 364
Flinn, R. A., and **R. J. Ely,** strain-gauge testing railway irons, 378
Floe, C. F. *See* Rengstorff, G. W. P.
Flores, M. M., heavy forging presses, 373
Flux, J. H., open-hearth models, 190
Folkhard, E., Jominy test, 264
Föppl, O., elasticity constants, 377
Ford, H., cold rolling, 264 ; cold-rolling compression test, 307
Foryst, J. *See* Smialowski, M.
Fournier, J. A. *See* LaRochelle, A. E.
Franca, E. P. *See* de Carvalho, H. G.
França, J. M., grain-growth control by aluminium, 368 ; hardening, 372 ; metallurgical terms, 391 ; *see also* Kitice, T., Schmieglow, E.
Franceschini, F. J. V. de A., silica refractories, 364
Fraser, J. P., and **P. E. Kyle,** steel-moulding sand mixtures, 263
Friedman, L. T., hot-spot machining, 159
Fryczkowski, E., metallurgical industry in U.S.S.R., 166
Fukui, S., deep-drawing researches, 158
Funk, C. R., chromium reduction and recovery in open-hearth, 156
Funk, E. J., jun., uses of inert gases, 391
Fusfeld, H. I., and **Josephine C. Feder,** high-speed motion-picture study of necking, 376
Futter, K. L., patternmaking, 369

Gagnebin, A. P., K. D. Millis, and **N. B. Pilling,** ductile cast iron, 384
Gailer, J. W., and **E. J. Vaughan,** *Book* : " Protective Coatings for Metals," 391
Gallego, M. A., pilot-plant sintering ; 362 ; sintering trials, 93
Galmiche, P., protection by chromium diffusion, 97
Gannett, H. E., Heliarc rolling-stock welding, 266
Garde, A., electro-hydraulic arc-furnace control, 367
Garrels, E. M. *See* Howland, A. L.
Gascoigne, J. A., paint testing, 268
Gaskell, J. L., melting-shop lighting, 88
Gayan, J. B., X-rays, 382
Gaydon, A. G., and **H. G. Wolfhard,** low-pressure flames, 363
Gaynor, F., *Book* : " Pocket Encyclopedia of Atomic Energy," 166
Geach, G. A., hairline cracks, 269
Geil, G. W., and **N. L. Carwile,** reduction-of-area gauge, 377
Gengenbach, O., induction heating, 95
Gentry, C. H. R., and **D. Newson,** polarographic-analysis apparatus, 165
Gérin, M., hot-blast stoves, 258
Gernelle, H., and **P. Nicolas,** defects in large pulleys, 157
Gertsman, F. M. *See* Maltsev, V. F.
Gerzina, J. A. *See* Stern, G.
Gibson, J., cold-rolling compression test, 307
Gilbert, P. T. *See* Hadden, S. E.
Gilchrist, C. W., casting large engine bases, 157
Gill, E. T., and **E. N. Simons,** *Book* : " Modern Welding Technique," 166
Gille, G. *See* Willems, J.
Gille, G., and **J. Willems,** temperature and flame measurements in converter, 258
Gillett, H. W., obituary notice, 359
Giron, V. S. *See* Velayos, S.
Glaubitz, H. *See* Meingast, H. W.
Glaubitz, H., and **H. M. Meingast,** hardness and tensile testing of gear wheels, 101
Gmelins Handbuch, *Book* : " Aluminium," 167
Gobert, G. *See* Breckpot, R.
Gokcen, N. A. *See* Dastur, M. N.
Gold, J. E. *See* Argobast, A. H.
Goncalves, H. C. *See* Brosch, C. D.
Goncharskii, L. A., photographic recording of dynamic strains, 100
Good, W. B. *See* Pardue, T. E.
Goodeve, (Sir) Charles, blast-furnace reactions, 318 ; Sidney Gilchrist Thomas, 165
Göttfert, O., protective-atmosphere brazing, 374
Graham, J. P. *See* Flickinger, C. H.
Grainger, J. A., stamping, 373
Greene, W. A., refractories-consumption indices, 364
Greenwood, H. W., metal powders in engineering, 99
Gregg, A. W., ferrous furnaces in U.S.A. and Canada, 156
Griffiths, E., tool standardization, 100
Griffiths, R., melting-shop structures, 88 ; obituary notice, 359
Grosjean, A. *See* Marbais, L.
Grossman, N., and **C. W. McGregor,** transition temperature in plastic flow, 377
Grote, I. A. De. *See* De Grote, I. A.
Grover, H. J. *See* Tarasov, L. P.
Groves, W. T. *See* Widrig, S. L.
Grubitsch, H., corrosion, 386
Grubitsch, H., and **P. Warbichler,** phosphorus prints, 271
Grundig, W., ductility and deformation, 379
Guédras, A., crystallization in cast iron, 368
Guédras, M., core and mould drying, 370 ; cupola linings, 155
Guiler, G. M. *See* Schwartz, H. A.
Gummert, H., large forging shops, 372
Gummert, H., and **W. Bücking,** forging-shop maintenance, 372
Gunn, A., cupola refractories, 365
Günther, O., preheating forging-press air, 372
Gurney, C., effects of rate of loading on fracture, 268

Haase, L. W., water oxygen content and corrosion, 387
Habell, K. J., phase-contrast microscopy, 384
Habraken, L., electron-microscope study of chromium–molybdenum steels, 163
Hackerman, N., and **E. L. Cook,** effect of adsorbed organic compounds, 387
Hadden, S. E., and **P. T. Gilbert,** corrosion of cadmium and zinc coatings, 270
Hadfield, D. *See* Braybrook, A.
Haenel, J. G., corrosion of steel cables, 387
Hagen, J., core-blowing machine, 370
Hague, E., salt baths, 95
Hajtó, N., nodular iron, 261
Hajtó, N., and **F. Varga,** cupola iron under high-alumina slag, 260
Hall, J. H., flasks for steel castings, 369 ; steel castings in welded assemblies, 261
Hall, W. H., U. W. Arndt, and **R. A. Smith,** spectrometer for X-ray powder-diffraction lines, 269
Halliday, I. M. D. *See* Chesters, J. H.
Hallimond, A. F., phase-contrast microscope, 385
Halls, E. E., electrolytic deposition of tin–zinc alloys, 98 ; electrolytic polishing, 96.
Hamacher, R., electric heat-treatment furnaces, 372
Hamelin, M., high-temperature reactions in refractory-oxides systems, 155
Hamilton, C. P., electrical load in blast-furnace operation, 258
Hammond, J. *See* Martin, C. H.
Handley, R. L., Swedish foundry practice, 368
Hanlon, F. N., geology of Australian coal deposits, 361
Hannick, A., and **A. Hans,** spectrochemical analysis, 165
Hans, A., *Paper* : " Rapid Estimation of Phosphorus in Steels," 118 ; line-breadth of spectra, 165 ; spectrographic analysis, 164 ; *see also* Coheur, P., Hannick, A.
Hansen, M., flow in industrial furnaces, 156
Hara, S. *See* Ishii, R.
Hardwick, D., *Paper* : " Continuous Temperature Measurement of Liquid Steel in the Furnace," 147
Hardy, H. K., thermodynamics in alloy systems, 207
Hardy, H. M., and **T. O. Kuivenen,** strain-gauge testing cast-iron beams, 378 ; strain-gauge testing cast-iron crankshafts, 377
Harley, J. H. *See* Dunleavy, R. A.
Harris, H. H., and **E. F. Ross,** centrifugal casting, 370
Harvey, Eleanor M. A., examination of magnetic phases, 385
Hatch, T. F., foundry dust control, 372
Hathaway, C. M., dynamic-strain recording equipment, 379
Haught, R. S. *See* Caine, J. B.
Hauth, F., American rolling mill practice, 158
Haworth, R. D., jun., abrasive wear, 269
Hayes, H., *Book* : " Drop Forging," 101
Heal, H. T., high-temperature microscope, 385
Hébrant, F., sheet-mill buildings, 159

Heger, J. J., sigma phase in chromium steel, 383
Hekker, F., reflecting microscope, 385
Henley, J., cupola charging-skip modification, 260
Henry, C. *See* Broida, V.
Henry, P., agglomeration of iron ores, 362
Herasymenko, P., and **G. E. Speight**, *Paper*: "Ionic Theory of Slag–Metal Equilibria. Part I," 169; *Paper* "Ionic Theory of Slag–Metal Equilibria. Part II," 289
Herbst, H., wire-rope lay, 271
Herman, W., blooming mill, 264
Herr, W. *See* Erbacher, O.
Herrmann, R. H., cleaning castings, 371
Herzog, E., deep-drawing test machine, 160; electrochemistry of rust films, 388
Hessenberg, W. C. F., cold-rolling compression test, 308; strain in steel wire, 319
Hetzig, R. A., powder-metallurgy developments, 98
Heymann, J. C., Banox drawing lubricant, 158
Hillier, H., boiler corrosion, 387
Hillman, V. E., strain-gauge testing cast loom parts, 378
Hilton, B. R., *Book*: "Welding Design and Processes," 167
Hilty, D. C., chromium in acid arc furnace, 367
Hipperson, A. J., and **P. M. Tenby**, resistance welding coated sheet, 266
Hirst, G. W. C., supersonic crack detection, 381
Hoak, R. D., and **J. Coull**, manganese from low-grade ores, 93
Hoar, T. P., biographical note, 90
Hoar, T. P., and **D. V. Atterton**, *Paper*: "Penetration of Molten Metal into Compacted Sand," 1
Hobman, G., surface-roughness meter, 371
Hoffman, C. F., comparison of large and small blast-furnaces, 259
Höfges, H. *See* Willems, J.
Höhle, H., American wire industry, 264
Holdeman, G. E., and **J. C. H. Stearns**, nodular iron, 261
Holden, A. N., preparation of single crystals, 163
Holden, J., multiple-beam interference methods, 385
Hollomon, J. H. *See* Fisher, J. C.
Holm, R., hardness, 380
Holmberg, A., AIB-Holmberg sintering process, 363
Holmes, P. A. S., internal rail traffic, 355
Holub, E. M., oxygen scrap cutting, 266
Hoselitz, K., alloy systems, 202, 210
Hotat. G. *See* Marbais, L.
Houdremont, E., and **H. Schrader**, embrittlement phenomena, 161
Houghton, H. C., personnel training, 166
Hounsfield, R. B., radio control of iron and steel works traffic, 352
Howard, J. C., arc-furnace design, 262; high-frequency furnaces, 262
Howat, J. T., flame hardening, 264
Howes, R. S. *See* Chesters, J. H.
Howland, A. L., E. M. Garrels, and **W. R. Jones**, chromite deposits in Montana, 93
Hoyt, S. L., low-temperature behaviour, 162
Hudson, A. J., obituary notice, 359
Hudson, J. C., *Paper*: "Corrosion of Bare Iron and Steel in Sea Water," 123
Hughes, M. L., *Paper*: "Use of Aluminium in Hot-Dip Galvanizing," 77
Hultgren, A., and **O. Carlsson**, *Paper*: "A Note on Silicon Distribution Between Austenite and Liquid Metal in Freezing Hypo-Eutectic Cast Iron," 303
Hummitzsch, W., and **A. Schmidt**, welding manganese steel, 374
Hunnicut, H. A., classification of nickel steels, 384
Hunter, A., steelworks cranes, 250
Hurst, J. E., and **R. V. Riley**, hot-extraction gas analysis, 271
Hussey, F. W., Rockwell C hardness, 380
Hustin, M. P., and **W. Soete**, tramway-rail welding, 159

Igelman, W. O., and **F. S. Nussbaum**, improving electric-steel quality, 367
Ihsen, H. C. *See* Sanz, M. C.
Iitaka, I., flake graphite, 261; graphite formation, 261; wear resistance of chromium plating, 267
Il'in, V. A., sulphuric acid determination in plating electrolytes, 164
Indelli, A *See* Cavallero, L.
Institute of Fuel, *Book*: "Modern Applications of Liquid Fuels," 272
Institute of Petroleum, *Book*: "Modern Applications of Liquid Fuels," 272
Institution of Metallurgists, *Book*: "Metallurgical Applications of the Electron Microscope," 271; *Book*: "Metals in the Service of Mankind," 271
Ishii, R. *See* Wada, I.
Ishii, R., and **S. Hara**, determination of vanadium, 164
Iturrioz, D., castings production, 157
Ivernal, J. *See* Pelabon, M.
Iverson, H. G., flotation of iron ores, 93
Iznardi, de R. e, bentonites, 263

Jack, K. H., martensite tempering mechanism, 17
Jacquesson, R., and **P. Laurent**, fatigue-testing machine, 380
Jacquet, P. A., electrolytic polishing, 375; reversibility of temper-brittleness transformation, 100
Jacquet, P. A., and **Adrienne R. Weill**, electrolytic polishing of chromium plating, 160
Jaffe, L. D., temper brittleness, 264
Jaffe, L. D., E. L. Reed, and **H. C. Mann**, discontinuous-crack propagation, 161
Janecek, F., high-top-pressure blast-furnace operation, 365
Januszewicz, P., centrifugal-casting trials, 370
Jeffes, J. E. H. *See* Richardson, F. D.
Jenkins, I. *See* Dovey, D. M.
Johnston, B. G. *See* Knudsen, K. E.
Joly, G., knock-out temperature, 156
Jones, E. R. W. *See* Finniston, H. M.
Jones, F. W., and **W. I. Pumphrey**, *Paper*: "Free-Energy and Metastable States in the Fe–Ni and Fe–Mn Systems." *Discussion*, 200. *Correspondence*, 206. *Authors' Reply*, 211
Jones, W. R. *See* Howland, A. L.
Joseph, T. L., and **E. P. Pfleider**, American iron-ore deposits, 361

Kassner, J. L., and **Mary A. Ozier**, determination of phosphorus in iron ore, 164
Katsurai, T., and **S. Yamaguchi**, explosive-eroded iron surface, 270
Kawiński, S. *See* Krupkowski, A.
Keating, F. H., corrosion-resistant steels in chemical industry, 163
Keir, G., heating descaling baths, 160
Keller, F., cutting power, 264
Kennedy, A. J., application of Andrade's creep formula, 383
Kent, F. T., free-machining steel, 94
Keohane, K. W., reflecting microscope, 385
Kershaw, C. A., arc-welding power supply, 265
Kessler, T., Sendzimir mill, 373
Khanin, S. E., deformation in shearing, 100
Kilby, J. A., *Paper*: "The Production of Steel Plates in Scotland," 29. *Corrigenda*, 360
Kimbell, A. R., strain-gauge measurements of drawing loads, 378
Kimmel, S. H. *See* Preston, E.
King, R., safety precautions in radiography, 269
King, R. J., strain gauges, 377
Kitchen, H., biographical note, 329; *see also* Shirley, H. T.
Kitice, T., graphitic steel, 384; malleablization, 369; powdered charcoal in moulding sand, 369; *see also* Santos, L. A. de L.
Kitice, T., and **J. M. França**, welding, 374
Kleinberg, A. T., chrome-magnesite refractories, 364
Klemm, H., segregation, 386
Knowlton, H. B., induction hardening, 95
Knox, J. D., last hand-charged blast-furnace in America, 258
Knudsen, K. E., W. H. Munse, and **B. G. Johnston**, stresses in hot-metal ladles, 265
Kohn, A., boron steels, 195
Kolker, R. M., tool-tip grinding, 159
Koopman, K. H., and **F. J. Pilia**, welding sheet steel, 266
Kopas, J. S., personnel training, 166
Kozakevitch, P., slag viscosity, 368
Kravchenko, V. S., electromagnetic testing wire ropes, 162
Kromer, F., Turkish mineral resources, 361
Krupkowski, A., and **S. Kawiński**, anisotropy of annealed metals, 99
Kubaschewski, O., alloy systems, 204
Kuivinen, T. O., cast-iron crankshafts, 370; *see also* Hardy, H. M.
Kuniansky, M., ductile iron, 368
Kutzelnigg, A., zinc and iron, 100
Kyle, P. E. *See* Fraser, J. P.

Laidler, D. S., and **J. Taylor**, carburization process, 94
Lamm, O., radioactive applications in metallurgy, 166
Lanari, A., jun., Minas Geraes iron industry, 391
Landra, F. de I., determination of molybdenum, 389
Landis, R. M., radiography of castings, 382
Lane, P. S., engine wear, 379
Langard, K., electrolytic polishing, 386
Langner, A. J., sulphur and phosphorus in cupola/converter process, 262
Lankford, W. T., S. C. Snyder, and **J. A. Bauscher**, asymmetrical deep drawing, 264
Laplanche, H., killing in acid converter, 259; structural diagrams for alloy cast irons, 163
LaQue, F. L., corrosion of mine-hoist ropes, 387; corrosion prevention, 164
Larke, (Sir) William J., traffic of iron and steel works, 355
Larke, W. M., traffic of iron and steel works, 350
LaRochelle, A. E., and **J. A. Fournier**, determination of magnesium, 389
Larsen, R. G., and **G. L. Perry**, boundary lubrication, 373
Laurent, P. *See* Jaquesson, R.
Lazan, B. J., creep and rupture testing, 161
Leatherman, A. *See* McMaster, R. C.
Leckie, A. H., open-hearth models, 188
Leder, P. L. J. *See* Fergusson, H. B.
Leduc, A. E., powder cutting, 159
Leite, P. G. P., induction furnaces, 372
Leland, C. H., gas carburizing, 157
Lenel, F. V., impurities in metal powders, 376
Lepp, H., alloy systems, 206
Lescop, P. *See* Vidal, G.
Leven, M. M., stress in shaft keyways, 379
Levey, G. W., lighting in iron and steel industry, 166
Lewartowicz, E. *See* Audubert, R.
Lewes, K. B., wire and rod production, 264
Liceaga, J. M. *See* Arnal, T. G. y.
Linnet, J. W., flame propagation, 363
Lipson, C., G. C. Noll, and **L. S. Clock**, significant strengths of steels, 161
Littlejohn, F., finishing stainless steel, 160
Liu, Y. H. *See* Owen, E. A.
Lloyd, F. N., foundry costs, 262

Lloyd, T. E., Marforming, 96
Locati, L., and A. Ferro, stresses during surface hardening, 100
Logelin, quicklime in blast-furnace charge, 258
Loiseau, chromium plating, 160
Long, B. H. De. *See* DeLong, B. H.
Longo, O. *See* Brosch, C. D.
Lopez, J. V., effects of niobium and nickel, 383
Lopez, M. Z., Argentine foundries, 371
Lovegrove, S. B., radio control of rail traffic, 354
Low, J. R., jun. *See* Schwartzbart, H.
Low, S. *See* Malcolm, V. T.
Lownie, H. W., jun. *See* Stockett, S. J.
Lubbock, I., open-hearth models, 188
Ludwig, N. *See* Siebel, E.
Lundquist, R. H. *See* Anderson, A. E.
Lynch, A. C. *See* Richards, C. E.
Lynn, H. W., coil-galvanizing line, 267; continuous zinc coating, 375

McCaig, M., magnetostriction of permanent-magnet alloys, 381
McCauley, E. D. *See* Sears, E. C.
McComb, J. C., stamping developments, 95
McDowell, D. W., quench cracking, 161
McFarlane, J. *See* Astbury, N. F.
McGregor, C. W. *See* Grossman, N.
McIntire, F. L., rebuilding old coke ovens, 155
Mackenzie, I. M., biographical note, 91
Mackenzie, I. M., and Andrée Donald, *Paper*: "The Distribution of Temperature in Ingot Moulds and Its Relation to Ingot Structure," 19
Mackenzie, J. K., and R. Shuttleworth, sintering powders, 160
Mackworth, N., *Book*: "Researches on the Measurement of Human Performance," 167
McLaren, A. W., and L. W. Oswald, free-machining steel, 94
McLean, D., phase-contrast microscopy, 385; *see also* Trotter, J.
McLung, E. R., welding large shovel buckets, 266
McMaster, R. C., D. C. Martin, and A. Leatherman, metal transfer in arc welding, 265
MacMillan, R. T., preparation of titaniferous iron ore, 362
McNair, C., high-frequency melting in foundries, 262
McQuaid, H. W., small local-market steelworks, 367
Maddocks, W. R., and E. T. Turkdogan, *Paper*: "The effect of Sodium Oxide Additions to Steelmaking Slags." *Discussion*, 320. *Correspondence*, 321. *Authors' Reply*, 322
Madono, O., cast-iron piston rings, 370
Madsen, P. E. *See* Finniston, H. M.
Maffei, F. J., electrochemical corrosion, 386
Maffei, V., analysis in Brazil, 390
Malcolm, V. T., and S. Low, sigma phase in chromium–nickel steels, 383; strain-gauge testing cast-iron valves, 378
Malmberg, G., tensile tests on drilled specimens, 99
Maltsev, V. F., F. M. Gertsman, and M. P. Zheldak, cold-drawing lubricants, 158
Mann, H. C. *See* Jaffe, L. D.
Marbais, L., A. Grosjean, G. Hotat, M. Poverman, and P. Coheur, oxygen-enriched blast for converters, 156
Mardon, H. H., and M. D. Brisby, *Paper*: "Traffic of Iron and Steel Works." *Discussion*, 349. *Correspondence*, 355. *Authors' Reply*, 355
Mardon, H. H., H. A. Chapman, and M. D. Brisby, *Paper*: "Traffic of Iron and Steel Works." *Discussion*, 349. *Correspondence*, 355. *Authors' Reply*, 355
Marek, C. T., *Book*: "Fundamentals in the Production and Design of Castings," 391
Marin, J., biaxial-stress machine, 379; strain gauges, 377
Marizy, C., oxygen-arc deseaming, 159
Marsh, G. A. *See* Bond, D. C.
Martens, H. *See* Duwez, P.
Martin, C. H., and J. Hammond, annealing furnaces, 369
Martin, D. C. *See* McMaster, R. C.
Martin, F. A., steel-foundry productivity, 262
Masing, G., corrosion theories, 386
Mather, K. B., surface reproduction, 163
Mathien, V., spectroscopic determination of residual elements, 164
May, T. P. *See* Alexander, A. L.
Mayfield, P. C., coke-oven repairs, 155
Mechling, R., microhardness testing, 380
Mehlig, J. P., and Dorothy Durst, spectrophotometric determination of iron in ores, 164
Meingast, H. M., distortion in carburizing, 101; *see also* Glaubitz, H.
Meingast, H. W., and H. Glaubitz, effect of heat-treatment on gear wheel, 101
Melcher, G., and C. E. V. Cajado, reducibilities of Brazilian iron ores, 366
Melchor, J. L. *See* Pardue, T. E.
Melnitsky, B., foundry lighting and cleaning, 371
Melville, W. S., pulse magnetization, 381
Mendez, V., geology of iron-ore deposits, 361
Merck, R. A., air-conditioning crane cab, 265
Merrick, A. W., investment casting, 370
Merrill, L. L. *See* Nippes, E. F.
Mersot, G., oxy-acetylene scarfing, 266
Mewes, K. F., effect of temperature on steel gas cylinders, 101
Meynier, chromium plating, 160
Midlam, K., heat-treatment, 157
Mielentz, W., cracks in alloy-steel superheater tubes, 269
Miklowitz, J., fracture properties, 161
Millan, F., and F. Barbadillo, sintering Vizcaya iron ore, 362
Miller, O. O. and M. J. Day, grain-size etching, 270
Millis, K. D. *See* Gagnebin, A. P.
Milo, F. D. H. de. *See* de Milo, D. F. H.
Minamiōzi, K., and H. Okubo, notch effect, 268
Miner, J. W. *See* Sears, E. C.
Ministry of Health, report on corrosion of buried cast- and spun-iron pipes, 388
Mitchell, W. D., and D. Rosenthal, elongation of riveted joints, 379
Mochel, N. L., steam-turbine wear, 379
Mohler, F., strip mills, 264
Mondy, P., powder metallurgy for calculating-machine parts, 99
Mooers, A. B., welding motor-car wings, 159
Moraes, M. A., foundry mechanization in Brazil, 371; large ingot moulds, 370; steel castings, 369
Moraes, M. A., and F. Bocciarelli, feeder nomenclatures, 369
Moral, F. del. *See* del Moral, F.
Moreau, J. *See* Bénard, J.
Morris, C. E., electropolishing electrolyte, 267
Morris, T. B., gas-carburizing furnace, 157
Morisset, P., corrosion resistance of hard chromium deposits, 388; hard chromium plating, 160
Mort, J. H., power consumption in hot rolling, 373
Mota, F., Dominican iron-ore deposits, 361
Mottin, R. *See* Brosch, C. D.
Mowat, J., open-hearth process for foundries, 262
Mravec, J. G., bath-temperature measurement, 258
Mudd, O. C., pipe-cleaning, 375
Müller, A., effects of heat-treatment on chromium steels, 101
Müller, E., heavy forging presses, 373
Müller, H., tensile properties of tempered steels, 101; *see also* Diepschlag, E.
Munse, W. H. *See* Knudsen, K. E.
Muraca, R. F., photoelectric colorimetry, 271
Nadal, F. N., electroforming abrasives, 160
Naeser, G., and W. Pepperhoff, temperature measurement in converter, 257
Nahstoll, G. A. *See* Bryan, F. R.
Namy, G., hot-blast stoves, 258
Nascimento, J. O., metallography of alloy steels, 384
Naugle, B. W. *See* Davis, J. D.
Naylor, C. E., solution colouring stainless steel, 267
Neale, J., radio control of rail traffic, 354
Nelsey, J., steelworks cranes, 249
Nelson, G. A., Probolog tester, 162
Netto, B. C. de M., iron in Brazil, 390
Neustaeder, K., extra coke in blast-furnace practice, 258
Newby, M. P., *Paper*: "Experiments on the Gas and Fluid Flow in a Side-Blown Converter Model." *Discussion*, 186. *Correspondence*, 190. *Author's Reply*, 192; air flow in side-blown converters, 262; gas velocity measurement in blast-furnace, 317; open-hearth models, 187
Newell, I. L. *See* Edson, A. P.
Newell, J. G., preparation for brazing and welding, 159
Newell, W. C., oxygen enrichment in cupola, 262
Newson, D. *See* C. H. R. Gentry
Newton, C. L., and J. D. Swannack, strain-gauge testing Diesel parts, 377
Nicholls, G. W., large iron castings, 260
Nickols, D. G., interferometry in abrasion testing, 385
Nicolas, P. *See* Gernelle, H.
Nilsson, F., inductive stirring, 94
Nippes, E. F., L. L. Merrill, and W. F. Savage, arc-welded cooling rates, 365
Nippes, E. F., and W. F. Savage, temperature control in arc welding, 265
Nippes, E. F., and R. F. Underhill, spot welding, 266
Nizortsev, A. A., recording pens, 94
Noll, G. C. *See* Lipson, C.
Novák, J., flakes in steel, 269
Novinsky, M., hot-blast cupolas, 368
Nunez, S. G., Spanish iron and steel industry in seventeenth century, 165
Nurse, R. W. *See* Parker, T. W.
Nurse, T. J. *See* Vernon, W. H. J.
Nussbaum, F. S. *See* Igelman, W. O.

Ode, W. H., *See* Davis, J. D.
Oelson, W., thermodynamics of iron alloys, 163
Oesterle, A. A., fine-ore nodulizing, 154
Ogburn, F., and A. Brenner, deposition of radio-active chromium, 97
Okoshi, M., and K. Watanabe, hardening hacksaw blades, 264
Okubo, H. *See* Minamiōzi, K.
Oldfield, A., biographical note, 357; *see also* Shirley, H. T.
Olmsted, R. H., cupola-tuyere modifications, 260
O'Neill, H., boron steels, 198; cold-rolling compression test, 308
Orosco, E., cupola coke, 368; pseudo flakes in tungsten steel, 384; Rockwell hardness, 380; Rockwell technique, 380
Oswald, L. W. *See* McLaren, A. W.
Otto, H., by-products recovery from coke, 155
Owen, E. A., and Y. H. Liu, *Paper*: "Further X-Ray Study of the Equilibrium Diagram of the Fe–Ni System." *Discussion*, 200. *Correspondence*, 206. *Authors' Reply*, 211
Ozier, Mary A. *See* Kassner, J. L.

Palazzi, A., statistics in research, 100
Pampus, E., compressed air in forging shops, 373
Paquette, D. G. *See* Edson, A. P.
Pardue, T. E., J. L. Melchor, and W. B. Good, repeated-strain tests, 379

Parker, T. W., and **R. W. Nurse**, blast-furnace slag in cement making, 259
Parr, J. G., iron–manganese system, 206
Paschkis, V., heat transfer in foundry, 261
Patrick, W. A., and **H. B. Wagner**, anodic corrosion, 386
Patterson, W., nodular iron, 368
Patton, W. G., self-lubricant powder-metal bearings, 99
Pavesic, E. J., heat-treatment, 94
Pawlek, F., steelmaking developments, 94
Payntor, C. A., annealing furnace, 372
Pearce, J. H., and **W. Bramhall**, foundry arc furnaces, 262
Pelabon, M., and **J. Ivernal**, dilatometry of chromium–molybdenum steels, 377
Pepperhoff, W. *See* Naeser, G.
Perch, M. *See* Russell, C. C.
Periane, M. M. A. *See* Varela, M. T.
Perrin, R., trends in French iron and steel production, 156
Perry, G. L., *See* Larsen, R. G.
Peters, J. F., effect of coke stability on blast-furnace working, 258
Petracchi, G., nephelometric test, 165
Pettit, D. L., crane-hoisting motor, 265
Pfleider, E. P. *See* Joseph, T. L.
Philip, A. R. *See* Chesters, J. H.
Phillips, A., Brazilian ore resources, 361
Piaskowski, I., physical structure of metals, 100
Piens, M., French iron industry, 390
Pierce, J. J., supersonics and X-rays, 269
Pignot, A., corrosion of gas cylinders, 164
Pilia, F. J. *See* Koopman, K. H.
Pilling, N. B. *See* Gagnebin, A. P.
Pinto, F. F. P., Brazilian coking coal, 364 ; residual-stress determinations, 269 ; superlattice structures, 386
Pison, A. G. *See* Carey, J. D.
Pittwood, E., traffic of iron and steel works, 352
Piwowarsky, E., acicular cast iron, 368
Piza, F. A. de T., Catalan forge, 384 ; direct reduction of iron ores, 366 ; sponge-iron production, 366 ; sponge-iron production in Sweden, 155
Platte, W. N., flash welding, 266
Plimpton, T. F., comparison of large and small blast-furnaces, 258
Poboril, F., explosive-impact tests, 161
Pobořil, F., and **F. Šicha**, weldability test, 374
Podczaski, B., open-hearth practice in Argentina, 366
Polakowski, N. H., *Paper* : "The Compression Test in Relation to Cold Rolling." *Corrigenda*, 305. *Discussion*, 305. *Correspondence*, 310. *Author's Replies*, 311, 312.
Polo, S. *See* Rius, A.
Popel, A. A. *See* Toropova, V. F.
Pomp, A., and **G. Gesche**, isothermal hardening in wire production, 263
Portevin, A., work of Floris Osmond, 390
Pospeloff, D., possibilities of pig-iron production in Brazil, 155
Post, C. B., and **D. G. Schoffstall**, temperature measurement in electric furnace, 257
Poverman, M. *See* Marbais, L.
Prado, L. C. do. *See* do Prado, L. C.
Prentice, J. R., coal washing, 364
Preston, E., **A. C. Sedlachek, W. C. Wardner**, and **S. H. Kimmel**, hot-repair of coke ovens, 155
Přibyl, J., quality control in steel foundries, 371
Prosser, L. E., open-hearth models, 186
Pumphrey, W. I., necking, 377 ; *see also* Jones, F. W.

Que, La, F. L. *See* LaQue, F. L.

Radino, S. M. L. *See* Feijo, A. H. da S.
Radzwicki, K., quality control of steelplant products, 100
Rait, J. R., arc-furnace refractories, 364 ; effects of boron, 198
Ramalho, J., basic electric furnace, 367
Ramonacho, M. M., weldability, 96
Randall, W. F., and **H. H. Scholefield**, metallurgical factors and magnetic properties, 381
Rankin, D. B., hard-facing, 374
Räntsch, K., *Book* : "Genauigkeit von Messung und Messgerät," 102
Rapatz, F., heat-resisting steels, 382
Ravery, M. *See* Delbart, G.
Raynor, G. V., microscopy of iron–nickel–aluminium system, 200 ; iron–nickel–chromium system, 201 ; thermodynamics in alloy systems, 201
Ré, V. L. *See* Barros, C. de R.
Redmond, J. A., induction hardening, 95
Reebel, D., Cadweld process, 266 ; soaking pits, 372
Reed, E. L. *See* Jaffe, L. D.
Rees, W. P., **R. D. Burns**, and **A. J. Cook**, *Paper* : "Constitution of Iron–Nickel–Chromium Alloys at 650° to 800° C." *Discussion*, 200. *Correspondence*, 206. *Authors' Reply*, 212
Reese, D. J., ductile iron, 368
Reeve, L. *See* Bardgett, W. E.
Refinetti, R., foundry sands, 369
Rehder, J. E., desulphurization of cast irons, 261
Reininger, H., metal-spraying applications, 98
Rembowski, M., machining, 159
Rémond, V., hot-blast stoves in France, 258
Rengstorff, G. W. P., **M. B. Bever**, and **C. F. Floe**, carbonitriding, 263
Reynolds, D. A. *See* Davis, J. D.
Rich, E. A. E., electric power in sintering plant, 362
Richards, C. E., **S. E. Buckley, P. R. Bardell**, and **A. C. Lynch**, magnetic powder cores, 381
Richards, D. L. *See* Carter, R. O.
Richardson, F. D., *Paper* : "The Thermodynamic Background of Iron and Steel Making Processes. II—Deoxidation," 137 ; soda dephosphorization of pig iron, 320
Richardson, F. D., **J. H. E. Jeffes**, and **G. Withers**, *Paper* : "The Thermodynamics of Substances of Interest in Iron and Steel Making," 213
Riebensahm, P., *Book* : "Harterei-technische Mitteilungen, 101 ; hardening and heat-treating, 101
Rifkin, S., electrical equipment for open-hearth auxiliaries, 265
Riley, R. V., costs of radon in large-scale research, 318 ; *see also* Hurst, J. E.
Rippon, J. E., obituary notice, 359
Rius, A., and **S. Polo**, polarographic analysis, 165
Roberts, D. E., obituary notice, 359
Roberts, R. R. *See* Rollason, E. C.
Robiette, A. G., side-blown-converter design and practice, 261, 262
Robinson, A., flame velocities in open-hearth, 190
Robinson, R. C. *See* Carmichael, E. S.
Rocha, M. R., and **F. Bocciarelli**, Babassú coke in cupola, 368
Roebuck, A., British iron and steel industry, 391
Roehl, E. J., and **W. A. Wesley**, nickel fluoborate bath, 267
Rollason, E. C., and **R. R. Roberts**, *Paper* : "Effect of Cooling Rate and Composition on the Embrittlement of Weld Metal," 105
Romanoff, M. *See* Denison, I. A.
Roš, M., fatigue of metals, 100
Rosen, C. G. A., Diesel-engine wear, 379
Rosenthal, C. *See* Mitchell, W. D.
Rosenthal, P. C., foundry melting, 368
Ross, E. F., investment casting, 370 ; *see also* Harris, H. H.
Ross, J. R., billet furnace, 372
Rossi, J., jun., rolling-mill efficiency, 373
Roubeaud-Valette, J., wire drawing, 96
Royal Aeronautical Society, *Book* : "The Properties of Metallic Materials at Low Temperatures," 102
Rudberg, H. *See* Bylund, K. G.
Rüegg, W. *See* Stähli, G.
Ruffolo, F., foundry costing system, 371
Russell, C. C., M. Perch, and **J. F. Farnsworth**, coal-expansion pressure in coking, 154
Rusz, J. *See* Smialowski, M.
Rutkowska, H. *See* Rutkowski, W.
Rutkowski, W., and **H. Rutkowska**, pressing and sintering powders, 98

Sachs, G., **G. Espey**, and **J. Taub**, cupping blanks, 264
Sadler, G. V., steelworks cranes, 251
Saint-Vaulry, R. de. *See* de Saint-Vaulry, R.
Sakui, S., changes on heating and cooling, 386
Sakui, S., and **K. Sato**, wire heating and cooling, 372
Sampelayo, P. H., geology of Spanish iron-ore deposits, 361
Sample, M., combustion in oil-fired open-hearth, 259
Samyn, H., submarine welding, 375
Santos, L. A. de L., cast irons for glass moulds, 384
Santos, L. A. de L., and **T. Kitice**, cast irons for resistance elements, 384
Santos, T. D. de S., low-shaft electric smelting furnace, 365 ; Monlevade sintering plant, 363 ; sintering, 363
Sanz, M. C., and **H. C. Ihsen**, heat flow in rocket-motor walls, 269
Sariban, A. *See* Vandeperre, L. J.
Sato, K. *See* Sakui, S.
Saunders, H. L., G. B. Butler, and **J. M. Tweedy**, *Paper* : "Investigations on an Experimental Blast-Furnace." *Discussion*, 315. *Authors' Reply*, 318
Saunders, H. L., and **R. Wild**, *Paper* : "Distribution of Materials in the Blast-Furnace." *Discussion*, 315. *Authors' Reply*, 318
Savage, W. F. *See* Nippes, E. F.
Scalise, M., spectrographic analysis, 164
Schaeffer, A. L., stainless weld-metal constitution, 266
Schaeffer, A. L., and **R. D. Thomas**, corrosion resistance of stainless welds, 163
Schalliol, W. *See* Shepard, O. C.
Schauff, E., steel sheets, 372
Scheier, S. L., and **R. E. Christin**, plating drop-forging dies, 158
Scheur, E., solidification of metals, 371
Schmieglow, E., and **J. M. França**, tensile testing grey-iron bars, 377
Schmidt, A. *See* Hummitzsch, W.
Schmidt, G., mould design, 261
Schneider, M., wire-drawing dies, 373
Schoffstal, D. G. *See* Post, C. B.
Scholefield, H. H. *See* Randall, W. F.
Schrader, H. *See* Houdremont, E.
Schubert, H. R., *Paper* : "The Truth about Dud Dudley," 184
Schultze, G., pickling, 375
Schwartsman, D. L., and **H. J. Ceccantini**, logs of two basic open-hearth heats, 366
Schwartz, H. A., and **W. K. Bock**, tensile-test reproducibility, 376
Schwartz, H. A., and **G. M. Guiler**, determination of combined carbon, 165
Schwartzbart, H., and **J. R. Low, jun.**, yielding and strain-ageing of single iron crystals, 100
Scott, P. K., machining powder parts, 99
Sears, E. C., J. W. Miner, and **E. D. McCauley**, strain-gauge testing cast-iron sleeves, 378
Sedlachek, A. C. *See* Preston, E.
Seeds, W. E., reflecting microscope, 385
Seens, W. B. *See* Smith, G. V.
Séférian, D., weldability, 374
Segin, H., stamping-machine guides, 373
Sekino, M., determination of arsenic, 164
Sell, M. T., moulding-machine time and motion study, 370
Semper, E. S., gas cutting stainless steel, 266

Serrado, A., superfinishing, 160
Setubal, O. E., induction furnace, 372
Shank, E., and **J. Wulff**, boundary stresses in compression of powder compacts, 98
Sharp, H. W., hard-facing welding, 265
Shepard, O. C., and **W. Schalliol**, stress-rupture properties at elevated temperatures, 382
Shirley, H. T., **A. Oldfield**, and **H. Kitchen**, *Paper*: "A Statistical Study of the Behaviour of Spectrographic Source Units," 329
Shortsleeve, F. J., alloy systems, 210
Shuffstall, J. A., gating steel castings, 369
Shuttleworth, R. *See* Mackenzie, J. K.
Šicha, F., Ac_3 temperature, 386; *see also* Pobořil, F.
Siebel, E., and **N. Ludwig**, heat-resistant steels, 383
Siegel, M., mechanized foundry, 370
Silk, J. J., moulding sand, 263
Sillifant, R. R., and **W. A. Woollcott**, argon-arc welding, 374
Silva, J. M. da. *See* da Silva, J. M.
Silva, L. C. C. da. *See* da Silva, L. C. C.
Silvester, A. W., graphitization of grey cast iron, 261
Simons, E. N. *See* Gill, E. T.
Simpson, A. D., jun., cathodic protection, 389
Simpson, B. L., castings, 368
Sinclair, G. M., and **T. J. Dolan**, steel grain-size, 376
Skála, M., distribution of grey iron in foundries, 156
Skulari, P., internal stresses, 163; low-alloy boiler steels, 162
Sloan, J. J., and **L. R. Denny**, aircraft forgings, 95
Sloan, R. G., jun., stainless steel linings, 97
Sloman, H. A., and **E. L. Evans**, deoxidation of iron by aluminium, 367
Smalley, O., strain-gauge testing Meehanite beams, 378
Smialowski, M., and **J. Foryst**, inhibitors in acid pickling, 96
Smialowski, M., and **J. Rusz**, waste pickle liquor, 375
Smialowski, M., **E. Wrzesinka**, and **W. Stoklosa**, hydrogen determination in steel, 164
Smith, G. V. *See* Dulis, E. J.
Smith, G. V., **W. B. Seens**, and **E. J. Dulis**, hardened alloy steels, 382
Smith, R. A. *See* Hall, W. H.
Snyder, H. N., coal sampling, 390
Snyder, S. C., *See* Lankford, W. T.
Soete, W. *See* Hustin, M. P.
Souza, F. J. P. de. *See* de Souza, F. J. P.
Spaulding, W. D., repair of old coke ovens, 155
Speakman, J. E. D., obituary notice, 359
Speight, G. E., boron steels, 179; *see also* Herasymenko, P.
Spencer, L. F., forging stainless steels, 95; grinding stainless steel, 160
Stäbli, G., and **W. Rüegg**, electrolytic polishing and etching, 270
Stanley, G. H., developments in metallurgy, 390
Stanley, J. K., carbon in alpha iron, 163
Starkman, E. S. *See* Cattaneo, A. G.
Stearns, J. C. H. *See* Holdeman, G. E.
Stegner, A. L., cathodic protection, 389
Steinbach, H., extrusion press, 373
Steinort, E., permanent-magnet alloys, 381
Stempfel, G., sodium hydride descaling, 375
Stenzel, W., ageing of hardened steels, 101
Stern, G., rupture tests on stainless steel powder, 98
Stern, G., and **J. A. Gerzina**, iron-powder compressor blades, 99
Stewart, K. H., magnetic losses in sheet, 381
Stockett, S. J., and **H. W. Lownie, jun.**, strain gauges, 377
Stoklosa, W. *See* Smialowski, M.
Storey, W. J., melting-shop structures, 86
Stuhlmann, W., S-curve in cooling transformations, 101
Sully, A. H., alloy systems, 203
Sussex, A. G., electroplated corrosion-protective coatings, 97
Swannack, J. D. *See* Newton, C. L.
Swift, A. W. *See* Chatfield, C. H.
Swift, H. W., biographical note, *facing* 272
Szczeniowski, J., blast-furnace stoves, 365

Tabor, D. *See* Bowden, F. P.
Takahashi, N., electrolytic polishing, 267
Talbourdet, G. J. *See* Buckingham, E.
Tama, M., galvanizing furnace, 98
Tarasov, L. P., and **H. J. Grover**, effect of grinding on fatigue strength, 380
Tatnall, F. G., high-temperature testing, 161
Taub, J. *See* Sachs, G.
Taylor, A., microscopy of iron-nickel-aluminium system, 205
Taylor, C. F., friction and wear, 379
Taylor, J. *See* Laidler, D. S.
Taylor, J. R., distribution in blast-furnace, 316; steelworks cranes, 250
Templin, R. L., and **W. C. Aber**, miniature tensile specimens, 376
Tenby, P. M. *See* Hipperson, A. J.
Terrington, J. S., *Paper*: "Structural Frames for Melting Shops." *Discussion*, 85. *Correspondence*, 88. *Author's Reply*, 88
Thielsch, H., bulge testing sheet, 161
Thomas, R. D. *See* Schaeffer, A. L.
Thring, M. W., flames and furnaces, 363; open-hearth models, 187
Tierney, R. J., tool repairs by hydrogen-arc welding, 159
Tietjen, P. L., transport of Lake ores, 362
Tittel, O., Hungarian bentonite deposits, 93
Toeplitz, W. R., tolerances of powder-metallurgy parts, 376
Tokumitu, T., identification of aluminium nitride, 271
Tolansky, S., multiple-beam interference methods, 385
Toribio, A. P., transformers, 265
Toropova, V. F., **E. A. Zimkin**, and **A. A. Popel**, sulphate determination in plating solutions, 164
Torres, R. D., welding electrodes, 96
Towndrow, R. P., distribution in blast-furnace, 315
Troiano, R., occupational analysis in metallurgy, 166
Trotter, J., and **D. McLean**, *Paper*: "Electron Microscope Study of Quenched and Tempered Steel." *Correspondence*, 17; *Authors' Reply*, 18
Turkdogan, E. T. *See* Maddocks, W. R.
Turnbull, T. *See* Fisher, J. C.
Turner, T. H., drawn steel wire, 320
Turpin, G. *See* Aubry, J.
Tweedy, J. M. *See* Saunders, H. L.
Twigger, T. E., centrifugal casting, 370
Tyler, J. D. *See* Collins, R. D.
Tyrrell, J. F., stamping dies, 158
Tysklind, E., sponge-iron production, 366

Uhlig, H. H., cost of corrosion in United States, 387
Underhill, R. F. *See* Nippes, E. F.
Underwood, L. R., *Book*: "The Rolling of Metals," 102; cold-rolling compression test, 305

van Arsdell, M., laboratory hazards, 390
Vance, E. R., spectrometer in electric-furnace control, 271
Vandeperre, L. J., and **A. Sariban**, welded structures, 159
van der Willigen, P. C., weldabilities, 96
Varela, M. T., and **M. M. A. Periane**, ultrasonic crack detection, 382
Varga, F. *See* Hajtó, N.
Vaughan, E. J. *See* Gailer, J. W.
Vaulchier, De. *See* De Vaulchier,
Velayos, S., M. P. Andrés, and **V. S. Giron**, energy loss in magnetization, 381
Veldhuis, H. D. *See* Bryan, F. R.
Vernon, W. H. J., T. J. Nurse, C. J. B. Clews, and **E. A. Calnan**, oxidation of iron at 200°–400° C., 270
Verö, J., degassing, 157
Veytia, M. *See* Wilson, I. F.
Vibrac, J., desulphurization of pig iron, 155
Vidal, G., and **P. Lescop**, effect of temperature on Young's modulus, 162
Visnyovszkaya, L., concentrating titaniferous ores, 362
Vitovec, F., deformation in tensile testing, 99
Voice, E. W., *Paper*: "The Measurement of Stockline Contours on Driving Blast-Furnaces," 84; *Paper*: "A Radio-Active Technique for Determining Gas Transit Times in a Driving Blast-Furnace." *Discussion*, 315. *Author's Reply*, 318
von Babo, H. *See* Erbacher, O.

Wada, I., and **R. Ishii**, determination of zirconium, 165
Waggoner, C. L., iron-ore mining and preparation, 154
Wagner, H. B. *See* Patrick, W. A.
Wagner, R. F., inspection of forged parts, 162
Wakefield, J. E., metallizing for corrosion protection, 98
Wall, R., batch plating, 160
Wallace, E. C., graphitic steel, 162
Walls, F. J., quality control of iron castings, 260
Walter, J., diamond dies, 96
Warbichler, P. *See* Grubitsch, H.
Wardner, W. C., increasing coke-oven-gas production, 364; *see also* Preston, E.
Warley, J., melting shop at Abbey works, 159
Watanabe, K. *See* Okoshi, M.
Watkin, E. R. S., traffic of iron and steel works, 351
Watts, A. B., cold-rolling tests, 309
Wayson, A. G., powder-metal gears, 99
Weale, R., optical constants of thin films, 375
Weber, H. J., foundry hygiene, 372
Weck, R., stress-relief of welded structures, 158, 266
Weill, Adrienne R., X-ray study of temper brittleness, 100; *see also* Jacquet, P. A.
Weincke, O., welding-electrode classification, 374
Wells, A. E., casting distortion, 369
Wells, J. E., *Paper*: "The Accurate Determination of Carbon in Low-Carbon Steels," 113; biographical note, 150
Welter, J. J., pig-iron production in blast-furnace, 155
Werneck, H. A., induction furnace for cast iron, 368
Werny, K., and **R. Eschelbach**, corrosion resistance of copper-bearing steels, 389
Wesemann, F., heat economy of iron and steel works, 257
Wesley, W. A. *See* Roehl, E. J.
West, R. A., steelworks cranes, 246
Wever, F., austenite-transformation kinetics, 157
White, A. M., quenching power of salt baths, 157
Wiberley, S. E. *See* Dunleavy, R. A.
Wickert, K., corrosion electrochemistry, 386
Widrig, S. L., and **W. T. Groves**, gas carburizing, 95
Wieschhaus, L. J., cast-steel shot, 97; cleaning forgings, 160
Wild, R., *Paper*: "Distribution of Materials in the Blast-Furnace," 339; *see also* Saunders, H. L.
Wilkes, G. B., jun., stress-corrosion tests, 389

Willems, J. *See* Gille, G.
Willems, J., G. Gille, and **H. Höfges,** temperature and flame measurement in converter, 259
Willey, J., press, 158
Williams, C. H. T., traffic of iron and steel works, 349 ; biographical note, *facing* 104
Williams, R. R., jun., iron-ore preparation, 154
Willigen, P. C. van der. *See* van der Willigen, P. C.
Willis, S., obituary notice, 359
Wilson, I. F., and **M. Veytia,** Mexican manganese deposits, 93
Winterer, heat-treating case-hardened steel, 101
Wise, D. A., and **L. N. Bramley,** *Paper* : "A Proposed Method for Specifying Travel-Motion Performance for Steelworks Overhead Cranes." *Discussion*, 246. *Correspondence*, 250. *Authors' Reply*, 252
Withers, G. *See* Richardson, F. D.
Withey, S. H., accountancy in metal industry, 166
Witt, E. J. de. *See* de Witt, E. J.
Wolf, K., wire-rope lay, 271
Wolf, W., decomposition of phosphate in blast-furnace slag, 259
Wolfhard, H. G. *See* Gaydon, A. G.
Wolfson, D. E. *See* Davis, J. D.
Wood, C. E. *See* Barrett, E. P.
Wood, D. S. *See* Clark, D. S.
Wood, R., duplexing in Brazil, 366
Woollcott, W. A. *See* Sillifant, R. R.
Worden, C. O. *See* Zapffe, C. A.
Workington Iron and Steel Co., *Book* : "Works Handbook," 103
Worthington, J. E., fluidity of metals, 371 ; fluidity of steels, 262
Wozniacki, J., grey-iron hardness scales, 380
Wright, (Sir) W. Charles, obituary notice, 360
Wrzesinka, E. *See* Smialowski, M.
Wulff, J. *See* Shank, E.
Würth, K., protective paints, 389
Wusatowski, Z., roll pressure, 373
Wuttke, F., *Book* : "Die Grauguss-Gasschweissung leicht gemacht!" 391
Wyatt, H., strain-gauge testing cast iron, 378
Wyman, C. *See* Faist, C. A.

Yamaguchi, S. *See* Katsurai, T.
Yü, J. T. M., biographical note, 357 ; *see also* Carlsson, C. G.

Zankel, K., patenting wire, 263
Zapffe, C. A., and **C. O. Worden,** cleavage patterns in ingot iron, 270 ; fractography of weld metal, 269
Zednick, V., non-metallic inclusions, 270
Zheldak, M. P. *See* Maltsev, V. F.
Ziegler, N. A., and **P. H. Brace,** hardening at sub-zero temperatures, 382
Zimkin, E. A. *See* Toropova, V. F.
Zoja, R., tensile-strength calculation from chemical composition, 99
Zubov, V. Ya., elastic limit of spring strip during bending, 99

Printed by HARRISON AND SONS, LTD., Printers to His Majesty the King, London, Hayes (Middx.), and High Wycombe